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ABSTRACT

Designed to improve undergraduate political science instruction, this monograph provides a guide to the design and use of simulations and games in the political science classroom. The book is divided into five chapters that stress the legitimate need and use of simulations and games. Chapter one outlines the background of simulations and games and describes the obstacles, constraints, resources, number of participants, timing, physical layout, and control necessary to make effective use of the materials. Chapter two reviews research on the effectiveness of simulations and games as a teaching method. Chapter three discusses educational objectives and goals of simulations. Emphasis is placed on such objectives as decision making, negotiation and bargaining, legislative structure and process, and systemic models. Chapter four concentrates on how to design and build your own simulation. Chapter five focuses on helpful hints for the implementation and use of simulations in the classroom. The appendices describe four sample simulations that may be useful for potential designeers. An annotated bibliography of simulation references is also included. (DE)

Instructional Resource Monograph/No. 3

SIMPLE SIMULATIONS

A Guide to the Design and Use of Simulation/Games in Teaching Political Science

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with
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SIMPLE SIMULATIONS: A Guide to the Design and Use of Simulation/Games in Teaching Political Science

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Foreword

Among the major activities of the American Political Science Association, the publication of the *American Political Science Review* and the Annual Meeting provide for exchange of information about research. Other major activities aim to adapt research to teaching needs, particularly at the undergraduate level.

Since the Association's establishment in 1904, there has always been a committee concerned with undergraduate education and, in each decade, an education committee has issued a report recommending instructional goals and strategies. Today, we have a different concept of useful educational activity; the Association is helping prepare instructional materials that can be utilized by teachers and students. The regional seminars for college teachers in the 1960's supported by a grant from the Ford Foundation, were a notable first effort of this sort. The seminars helped teachers locate and use new sources of course materials and different methods of instruction. Several hundred political scientists participated in these seminars.

At the end of 1972, with the support of a grant from the National Science Foundation, the Association established a Division of Educational Affairs and began to develop publications providing teachers and students with instructional guides and useful materials. *DEA NEWS for Teachers of Political Science*, a newspaper received by all Association members; SETUPS, that are student learning materials prepared by faculty in a workshop hosted by the Inter-University Consortium for Political Research; and a Bulletin for undergraduates on *Careers and the Study of Political Science* are the initial publications.

Simple Simulations: A Guide to the Design and Use of Simulation/Games in Teaching Political Science is the third in a series of monographs on instructional resources for political scientists. Role playing games that simulate political activities and processes have become important to teaching and learning about politics and public policy, both domestic and international. And with good reason: these simple simulations offer faculty and students an active instructional mode that many find an attractive supplement or alternative to lectures and discussions. Yet, as Charles Walcott and Anne Walcott point out, the effectiveness of simple

simulations upon learning achievement is not, on the whole, significantly different from that of other instructional methods. Nonetheless, Charles Walcott and Anne Walcott who have designed and used simulations in research and teaching, contend that, by creating original games and role playing exercises, faculty gain: 1) greater mastery over course material; 2) the flexibility to incorporate recent research findings and political developments into the course; and 3) more involvement by the students who are engaged in developing original exercises.

The authors' report on simple simulations is thus a realistic and selective guide to their impact. Additionally, this Instructional Resource Monograph differs from most existing studies on games and role playing exercises by its focus on the techniques whereby instructors can design their own exercises to suit their own course materials and college environment.

We hope that faculty who adopt the Walcotts' suggestions and prepare original simulations will share their experience in reports given at our professional association meetings and published in *DEA NEWS*.

Evron M. Kirkpatrick
Executive Director
American Political Science Association
January, 1976

Preface

> Sim · ū · lā' · tion, n. (Fr., from L. *simulatio (-onis)*, a feigning). 1. the act of feigning; pretense. 2. false resemblance, as through imitation. SYN.—pretense, counterfeiting.
>
> *(Webster's New Twentieth Century Dictionary,* 2nd ed., unabridged)

This volume is for those who wish to practice simulation (or *simulatio*) in the classroom; those who want to instruct through pretense, or counterfeiting. If that seems odd, bear with us. Aging dictionaries to the contrary notwithstanding, the term "simulation" has taken on an additional meaning in recent years, acquiring scholarly and pedagogical respectability in the process. One burden of this monograph will be to explicate that meaning, or set of meanings.

For now, briefly, we will note that simulation has come to mean, in the profession, a species of formal modeling of behavior systems. The subspecies are many and varied, but the one that will get attention herein is the simple simulation, or "game." This is not a particularly new idea. Classroom teachers have for a long time utilized games or role-playing exercises as adjuncts to their more orthodox modes of instruction. But only recently (the last 15 years or so) has such activity attracted much systematic attention, not to mention its very own terminology, beginning with the word "simulation" itself. Simulation has also attracted, from all appearances, a very substantial following. New simulations (games) are being developed faster than anyone, seemingly, can catalogue them. Instructors at every level and in all possible circumstances are reported to be designing or adopting simulations for their classrooms. Journals and newsletters have grown up to offer a means of communication among simulators and those who would study the effects of simulation.[1] At the more affluent, or generous, institutions impressive laboratories have been constructed wherein to practice the art. Business is booming, to the point where commercial publishers have systematically solicited simulation

[1] For instance, *Simulation and Games* (Beverly Hills: Sage) and *Simulation/Gaming/News* (Moscow, Idaho).

models for publication. The whole thing has become, in the eyes of some cynics, a fad. To others, though, it looks like a revolution.

The position taken here is that the sudden surge of interest in simulation, while hardly revolutionary in its implications, is more than a passing fancy. There is a legitimate need, perceived by many classroom instructors of political science, to somehow get beyond traditional lecture-discussion approaches to their subject. All sorts of things have been tried: field work, survey research, data analysis, personalized instruction, peer teaching and more. As efforts of this sort proliferate, a few needs become apparent. One, obviously, is for systematic investigation of the effects of these non-traditional approaches.[2] This, in turn, entails specification in the most careful, operational manner, of the objectives sought by such means. Also required is some discussion among practitioners of how one goes about employing the new techniques correctly, or most effectively. Logically, such advice should follow, not precede, research on the subject. If one is to learn from experience, it should be the best quality experience (i.e. research) from which one learns.

In what follows, we shall attempt to heed that advice, but largely fail. After a general, introductory discussion of simulation, we will review the available findings on the effectiveness of simulation. However, the results of this, while informative in certain respects, will be far from conclusive. We will also be drawing upon the insights presented in several excellent books and numerous articles on the subject of simulation. The net impact of this literature, though, is still far from the provision of a well-developed theory of how to design or use games. Thus we will also be reporting a good deal of personal experience, and rather a lot of speculation. The rationale for doing so is simply that many political science instructors are either using or considering simulation right now, and anything which contributes to the sharing of insights or techniques can be of use. Moreover, we genuinely hope that the proliferation of simulations in classrooms will begin to bring about an increase in the quantity and quality of research done on their effects.

In discussing simulation, we shall consistently address the reader as though she or he were a "designer" rather than only a "user" of simulations. The distinction is a bit arbitrary, since designers also use, and users often "design" by doing modification. But we definitely mean to encourage instructors to consider designing their own games, rather than consuming commercially published or otherwise acquired products. Partly, this stems from our conviction that much of what is published is not very good (there are, of course, significant exceptions), and just about always overpriced. More importantly, though, we are convinced that the designer of a game is likely to be its most effective user. Any game reflects a

[2] Another new journal, *Teaching Political Science* (Beverly Hills: Sage), represents a beginning in this respect.

particular view of reality along with some judgements about what is important. A game designer becomes highly sensitive to such matters in the process of making choices about a simulation model, whereas another user may fail to appreciate much of what has gone into that model. Moreover, the designer is also a course planner, and the simulation can be constructed so as to complement both a course (on paper) and an instructor. The same game, transplanted to another course, may or may not work well. Finally, a designer can modify a game on the basis of experience, while the consumer of a packaged product is fairly well stuck with what somebody else has put together. Thus our advice is aimed primarily at those who would consider inventing their own games—but it is intended also to be of use to instructors who are content to use the work of others, but would like to understand it a little better, or know more about how to use it.

We will begin with a discussion of the nature of simulation and its background in Political Science, but this will be kept fairly brief, as good discussions of these topics are readily available elsewhere. Our discussions of the characteristics that simulations may have will, however, serve to introduce several topics which will be discussed at greater length elsewhere, as well as to provide a basic understanding for those unfamiliar with the subject. Then, we will turn to the discussion of simulation's effectiveness, as noted above. This discussion will include a comprehensive inventory of the possible goals of simulation games, as viewed from the standpoint, mainly, of educational theory. Then, for those (we suspect that there are a few) who feel more comfortable working from course content than from theories about learning, we will devote chapter three to a discussion of simulation goals from the standpoint of course content.

Finally, chapters four and five contain our advice on how to build and use simulation games. Chapter four will concentrate upon design, while chapter five will assemble hints on implementation in a question-answer format. The appendices contain examples of simulations which will be referred to occasionally in the text, and which may be useful in giving ideas to other potential designers. A bibliography of simulation references can also be found at the back of the book.

A number of people deserve our gratitude for contributing in one way or another to the development of this monograph. In particular, we would like to thank Robert C. Noel of the University of California at Santa Barbara, who introduced us to the subject; P. Terrence Hopmann, of the University of Minnesota, an able collaborator in both research and teaching; Sheilah Koeppen, formerly of Minnesota, now of the APSA-DEA, who first inspired this effort, then waited far too long for it to arrive; and the Educational Development and Small Grants Programs at the University of Minnesota, as well as the Quigley Center of International Studies at Minnesota, all of which have supported simulation development in several ways, but mainly with money. Finally, as to the inadequacies, drawbacks, and just plain mistakes herein—we blame them on each other.

I. Simulation in Political Science

A simulation is an operating model of some aspect of reality. It is a model in the sense that it is "a set of statements which purports to describe patterns of relationships holding between components—units and variables—of that reality." (Brody, 1963, p. 191). The term "operating" refers to the fact that simulations are "representations of behaving systems that attempt to reproduce processes in action . . . (and) provide information about variable, component, and relationship changes within a system over time." (Dawson, 1962, pp. 4-5). Like all models, simulations reflect some sort of theoretical underpinning. It is theory, or something like it, which enables the model builder to identify the components of the "reality" to be modeled, and to establish the relationships among them.

The above may seem a bit heavy for a discussion of simple classroom games whose main purpose may be simply to put a little life into old Intro. to Poly Sigh. But any simulation, even the most humble, is best viewed as a (reasonably) serious attempt to model a system along the lines suggested by some kind of theoretical understanding of it. The simple simulations, or games, which we will be discussing are thus not entirely simple.

Background: Types and Purposes

Brody (1963) has conveniently divided the universe of simulation into three parts: computer simulations, "man-machine" simulations, and "all man" simulations. The former, which would be the most readily recognizeable throughout the scientific disciplines, involves the representation via a computer program of the theoretically salient elements of the system under simulation (the "referent"). The program is the model, and the primary utility of it is to permit exploration of the behavior of the model under various conditions, representations of which are fed into the model. Initially developed for heuristic theory-building and limited theory-testing purposes, computer simulations have come to play a role in the teaching of political science as well. While the rigor and precision of the computer simulation are a far cry from the classroom role-playing exercise, the logic behind both is essentially the same. The computer

model simply programs the whole system, leaving no room for the relatively capricious inputs of human actors, while the simple game employs, in effect, a minimal program to constrain those inputs (See Guetzkow, 1963).

"Man-machine" and "all man" simulations[1] begin to get us into the domain of simple simulations, as defined herein. They differ from one another in the degree to which the relationships among variables in the basic model are programmed (i.e. represented explicitly by formula) and interactive (i.e. affected by the behavior of the players, and providing feedback into the game). A sophisticated, elaborate man-machine simulation, such as Guetzkow's Inter-Nation Simulations (see Guetzkow, et al, 1963; also Alker, 1968) or Ray and Duke's METRO (Ray and Duke, 1968) will incorporate a complex program which interacts with the behavior of the human participants at many points. Thus the "machine" (which may be a computer, but may just be a pencil, some paper, and a list of rules) becomes necessary to compute the outcomes of such interactions. The programmed element of such a simulation may be taken as the environment within which the human decision-makers must work to achieve their ends.

At the other end of the continuum lie the simplest simulations, or role-playing games. Here there are rules which describe a situation and define roles, but no set of programmed relationships linking the behavior of the human actors to environmental responses. Players may be told, for instance, that they are a City Council and given some proposed ordinances to debate, but they will not be "evaluated" by a programmed electorate, have their decisions misconstrued by a programmed bureaucracy, or otherwise be subjected to consequences outside the human group in which they participate. The theoretical foundation of such a simulation need not be particularly elaborate, but neither is it wholly lacking. In defining the role of the Councilman, for instance, the simulation designer can hardly hope to avoid building in assumptions about what kinds of issues Council members care about, what kinds of resources they possess, what sorts of cues they can and will respond to, etc. In other words, even the simplest simulation shares the property of being a form of theoretical model. The consequences of this for teaching are obvious.

Each of the various types of simulation has been closely identified with a purpose other than instruction. Computer simulations have found considerable application in research (see for instance Pool and Abelson, 1962; Crecine, 1968), while role playing games with relatively elaborate scenarios have been used in a different sort of "research"—exploring policy options in a manner quite similar to traditional war-gaming (see Goldhamer and Speier, 1959; Bloomfield and Padelford, 1959). Man-machine

[1] The terminology seems unfortunate, in retrospect. We reproduce it only to preserve the flavor of an era.

games have been multi-purpose from their inception, but the designers of simulations such as the Inter-Nation (INS) have always placed a strong emphasis on their models as research settings which can be used both to examine theory and to explore alternative futures (see Snyder, 1963; Guetzkow, 1968).

The teaching purposes to which simulation may be put are just about as varied as the research applications and, for what it's worth, subject to less vigorous methodological criticism. Simulation can be used to teach modeling and formal theory-testing, for training in particular skills, to communicate theory or substance, or simply to develop empathy. The selection of a particular type of simulation will be a function of instructional purpose, at least in principle. Our interest in discussing "simple" simulations stems not from any belief in their necessary superiority, but simply from a belief that they are convenient and very useful, for certain purposes. We will get to those purposes in due course; first, it would seem desirable to define what we mean by "simple" simulations, and to describe what they are like.

The Simple Simulation

A simple simulation, as the term is used here, is a "game" in the sense that participants are placed in roles which require that they overcome obstacles in pursuit of goals. To be "simple," in our sense, the game must be one which can be carried on without the use of computers or other more-or-less exotic equipment or facilities. Finally, it should not require administration or supervision beyond the capacities of an instructor and, perhaps, one assistant. In short, we will be discussing role-playing games which can be utilized relatively conveniently under normal college classroom conditions.

Under this very general definition, a wide variety of games can be subsumed. The appendices provide four examples which differ from one another considerably. These examples, which have been included to provide concrete referents for those unfamiliar with simulation, reflect different "levels of analysis," a property which will be discussed at some length in chapter three. But simulations can differ from one another in many other ways as well, and it may be useful to look at some of these at this point.

Nature of the Task

Participants in a simulation seek to attain goals, in the face of obstacles. The goals may be stipulated by the game: participants in a legislative simulation, for instance, may be told that their basic goal is to maximize the likelihood of their reelection: all other activities in the game, such as drafting bills, holding hearings, debating, persuading, etc., should be undertaken with that in mind. Different actors may be given different goals: in the legislative example, the "legislators" will have different

constituencies to which they must respond, and some will impose more constraints than others. Or, one could instruct some legislators to seek mainly reelection, while orienting others toward seeking positions of leadership, or promoting an ideological position. In any event, a simulation which stiuplates such goals should also provide a reasonable way to measure performance, such as opinion polls suggesting what constituents want: the legislator could then be evaluated according to how closely he or she seemed to reflect constituent preferences.

Alternatively, simulation participants may be asked to decide for themselves what their goals will be, within reasonable limits. Some of the pros and cons of this will be examined in chapter four. For now, it will do to point out that some firm sense of goals should be developed at the outset of the game, and evaluation, if there is to be any, should be based upon fulfillment of those goals. It is also normally the case, for political simulations at least, that the "realism" of the game depends upon the "realism" of the goals. If we want students to learn about the dilemmas of choice faced by political actors, we will normally try to place them in situations whose opportunities, constraints, and incentives resemble those found in real politics.

Obstacles and Constraints

Given goals, what are the obstacles? They may, obviously, be embodied in the conflicting goals pursued by other actors. Goal conflicts may be represented as zero-sum (pure conflict, no mutually beneficial compromise possible), as in, for instance, a simulated election campaign. Or, they may be portrayed as mixed-motive (opportunities exist for compromise), as would often be the case in a legislative environment. The nature of the "problems" in the real world is the best guide to structuring a simulation.

Conflict with the environment is also possible. If students in a simulation are interacting not only with one another but also with a simulated environment, interesting problems can occur. Legislators who must deal with constituents (which can be simulated by a program, or set of rules) as well as other legislators, have environmental problems. Simulated executive budget-makers, as another example, might, in the simulation, have to deal in person only with one another. But the simulation model could also contain some rules governing the probable response of "Congress" to the budgetary product. If the student budget-makers are aware of this environment, and of at least roughly how it works, they must then treat it as an obstacle, one which does not allow them to solve their allocation problems, for instance, by giving more money to everybody. The appendix contains an example of a one-person simulation. This is a pure case of the environment as obstacle, since there are no other human actors to deal with.

A final obstacle, or constraint, worth noting is the rules of the game. Any simulation must have rules limiting the behavior of the participants

(see chapter four for a detailed discussion). Parliamentary procedure in a legislature is one common example. Rules against using physical force, rules stating how many votes are needed to win, or rules stating how long a session may last are others. Students in a simulation must seek their objectives within a framework of such rules. Of course, a simulation may be designed so that the rules can be modified, either by the participants or by the simulation director. But even then, modifications are themselves usually governed by rules.

Resources

The participant in a simulation pursues individual or group goals, in the face of obstacles and constraints, by manipulating certain resources. The nature of these resources will vary with the content of the game. In a legislative game, position (e.g. party office, or committee chair) provides resources, as does substantive expertise. In an international politics game, the military and economic capability with which a simulated nation is endowed will constitute resources to be manipulated by the nation's leaders. Personal attributes, such as the ability to persuade or to assert one's self will be important resources in any game which provides opportunities for interpersonal interaction. Information, about other players, about issues, or about the rules of the game itself, will often be a manipulable resource.

Some of these resources, such as the particular abilities or characteristics of participants, will not be especially controllable by the game designer or instructor. In designing a game, however, one does make choices about whether or how to furnish or deny opportunities for these attributes to matter. Other resources, though, can be controlled (e.g. access to information about the game, or about the strategy and strength of others), or simply furnished (e.g. positions of formal leadership). The design of a game tends to dictate what kinds of resources will matter, and in what ways.

Number of Participants

The minimum is one. A game in which one student copes with a programmed environment (see the example in the appendix) is a useful teaching device, both because the range of things that can happen is fairly closely controlled (by whoever designs the simulation, i.e. creates the environment and the rules of the game) and because such exercises can be used with classes of virtually any size. They can even be assigned as homework.

Most simulations, however, involve interpersonal interaction. Indeed, this is often claimed among their virtues. Politics is in large part a matter of dealing with other people, while studying politics is typically a process of reading, writing, and listening. Simulation is one way to get beyond

that. The number of people that can be accommodated in a simulation varies, of course, with the content of the simulation and the kind of interaction one wishes to see happening. If one is the minimum, the maximum cannot be stated so confidently. A simulated political convention could, in principle, contain as many participants as a real one. Whether anyone would have the facilities or the ambition to attempt that, however, is an open question. But it certainly is true that simulations can be large. The popular "Presidential Election" simulation by Weinbaum and Gold (1974), for instance, can accommodate at least 125 participants at a time. Indeed, the minimum for this game is 45. More commonly, though, simulations tend to be designed for groups somewhere in the 15-50 range.

The number of participants in a game need not depend particularly upon the number of participants in the real world system being simulated. Real world phenomena (technically, "referents") can be reduced in scale (e.g. a "Senate" need not have 100 members, but could get by with 30) or reduced even more by what might be called abstraction. Thus, an international system may be represented by as few as 15 or so students, through both scaling down the system (to, say, five nations) and allowing each nation to be "played" by a three-person team. See chapter three for a discussion of this process of abstraction, or representing complex systems with just one or a few players.

Timing

A simulation may last anywhere from a few minutes to several hours, or more. A small, finite task, such as is found in the first example in the appendix, need not take long, even if it is repeated. A legislature, on the other hand, can go on indefinitely. Simulations can be designed to be played as units, i.e. start to finish, without stopping, or to be broken into periods. The periods may represent natural breaks in the action, as when a legislative game is broken into periods of committee work, followed by periods of plenary session. Or, the periods may simply reflect convenience: games without natural breaks may be played until, for instance, the class is over for the day, then resumed when desired. For additional ideas about timing, refer to chapter five.

Physical Layout

The nature of the physical layout of a simulation depends, of course, upon the nature of the game itself and the number of people involved. The minimum requirement is simply a room large enough to accommodate the players who need to occupy it, plus tables and chairs. One can simulate many things—a city council, a summit conference, the Supreme Court—in a small room. A simulation of a political convention or a large legislative body would, even with some heroic scaling down, require more space.

Many simulations require more than one room. This is because they divide into subgroups. If a legislative simulation incorporates committees, for instance, it will probably be necessary to provide several rooms for them to meet in. Physical separation of players or teams is also useful when one wishes to restrict or prevent communication among them. In simulating an international crisis, for instance, one would not want the various "heads of state" all seated around a table, talking to one another freely. Separating them physically and imposing restrictions on the length and volume of messages which could be sent would probably enhance the realism of such an exercise.

In many simulations, it is also useful to create a "control" room, where those managing the game can work in some privacy. Since the game managers will typically be "playing" the environment in those games which have one (i.e. receiving data or decisions from the players, and transforming them, via game rules and formulas, into legitimate acts or environmental responses), privacy is required. To illustrate: in some international relations simulations, a sneak attack is possible. Usually this proceeds when the attacker files some sort of declaration of attack, specifying targets and weapons used, with the game managers. They may then have to compute, according to the rules, the immediate physical consequences of the attack—after first checking to make sure that the attacker in fact possesses all the resources designated for use. This checking, incidentally, requires that complete information on the state of the system (e.g. who has how much weapons) be on file with the game managers. Clearly, in a game of incomplete information (which international politics is, in general), such data and activities should not be accessible to just anybody. Hence the need for a control room, and for appropriate security.

Even in games where full information is available to all participants, or, if held in confidence, is held by the participants (e.g. a small legislative simulation in which all activity is conducted verbally, across the table), a control room can be useful. If a relatively inexpensive intercom system is available, it can be used to monitor the simulation without the physical presence of an instructor or other "authority." However, we are more concerned to point out that such equipment is not really necessary than to stress its advantages.

Control of the Game

Because simulations are run according to rules, they require the presence of someone to interpret and enforce those rules. Typically, this will be the instructor, whose main role will be that of umpire. But the instructor is apt to be involved in other aspects of the game, as well. The initial assignment of students to roles, the provision and explanation of game materials (manuals, forms to fill out, or whatever), and even such

chores as transmitting messages, either to an individual or to the entire group, are often handled by the instructor.

Beyond such housekeeping, the instructor, or whoever manages the game, will usually play the role of "nature" in games where the players and the environment interact. This may be primarily a paperwork job: receiving written inputs, such as resource allocation decisions, and acting upon them in the name of the environment, according to the rules governing environmental response. Sometimes, though, a measure of discretion is involved in such chores. For instance, in one of the examples in the appendix, legislators can poll their constituents to find out what is desired of them. The legislative districts, in this game, are based upon real ones, but there certainly is no reliable way to find out exactly how the inhabitants of any particular district would in fact react to the particular questions a student may have put to them. In this case the instructor, armed with all available data about the district, is asked to make his or her best guess and pass it along as an authoritative statement about the will of the people. At least, though, this is a between-sessions activity, and thus there is time for reflection. Other simulations may require that judgements must be made immediately so that the game can go on. However, this can be avoided in the design of a simulation, if desired.

An instructor who really wishes to get involved, or who simply wants to make things a bit more exciting, can play "nature" even more aggressively by randomly or strategically manipulating the environment. Most simulations in which there is an active environment can be made to accommodate this, if it is desired. Thus, in a stable but dull international system, one may interject a crisis (an assassination attempt, for instance, or nuclear proliferation) to which the players must improvise a response. There is a certain danger in this, though. An overenthusiastic manipulation of nature can so confound the development of carefully-laid plans and strategies that the players never get a sense of the outcomes of their best efforts. This can be frustrating, and can actually interfere with learning, if carried to extremes.

Conclusion

A simple simulation is an operating model of some aspect of political reality. As such it reflects a theoretical understanding of that reality, and presumably communicates that understanding. It may be all-man, or man-machine, provided in the latter case that the "machine" operation is rather simple. It places students in a realistic political environment, confronted by the following elements:

1. A role to play, in conjunction with others who also play roles.
2. A goal or set of goals to work toward.

3. Obstacles to goal-attainment, such as the conflicting goals of other players, or the resistance of the environment.
4. Constraints, in the form of game rules, limited information about the intentions of behavior of other players or the environment, or time.
5. Resources, such as interpersonal skills, information, or game-defined commodities (e.g. nuclear weapons).

The game then proceeds over a (roughly) predetermined period, culminating in some attainment of group and individual outcomes. Often, individual evaluation (but not necessarily grades) may be made on the basis of these outcomes. The simulation is usually followed by a discussion of what went on, and what can be learned from it.

This brings us to the next logical question. What, indeed, can be learned from all of this? We will examine that in the following chapter.

II. The Effectiveness of Simulation

Probably the most significant conclusion that has emerged from the research done thus far on the effectiveness of simulations is that far more has been claimed for them than has been demonstrated. Yet, this is not necessarily as damning as it sounds. Simulation research is still in its relative infancy and, given the well-known difficulty of establishing the effectiveness of any teaching technique, it is not particularly surprising that startling demonstrations of the superiority of simulation are lacking in the literature to date. Still, some interesting findings have emerged, and we can summarize them fairly briefly.

It is useful to begin with a discussion of what simulations *might* be able to do. The following list has been compiled by Greenblat (1973), and represents a comprehensive inventory of claims that have been made for the effectiveness of simulation:

1. Motivation and Interest
   a. Participation in simulation games is itself interesting and involving.
   b. Participation in simulation games increases interest in the *topics* simulated.
   c. Participation in simulation games increases interest in the *course* in which the simulation is employed.
   d. Participation in simulation games increases interest, enthusiasm, and commitment to *learning in general.*

2. Cognitive Learning
   a. Participants in simulation games gain *factual information.*
   b. Participants in simulation games acquire *explicit referents for concepts* used to describe human behavior; abstract concepts such as "organization," "power," "stratification," and "negotiation" take on concrete meaning.
   c. Participants in simulation games learn *procedural sequences.* 'The actors must, of course, learn the rules, comprehend the essential features of the environment, understand the implications of the alternatives open to them, and develop increasingly elaborate strategies. They must be taught to operate the simulated system, in

this instance in the hope that they will acquire a better concept of the larger system through a highly concentrated experience.' (Meier, 1967, p. 157)

d. Participants in simulation games learn *general principles* of the subject matter simulated (e.g. the need for social control, good communications, and long-range planning).
e. Simulation games provide simplified worlds from which students can stand back and understand the *structure* of the everyday, 'real' world. 'Games seem to display in a simple way the structure of real-life situations. They cut us off from serious life by immersing us in a demonstration of its possibilities. We return to the world as gamesmen, preparing to see what is structural about reality and ready to reduce life to its liveliest elements.' (Goffman, 1961, p. 34)
f. Participants in simulation games gain in *explicitness:* 'The capacity to identify consciously elements of a problem in an analytic or technical sense.'
g. Participants in simulation games learn a *systematic analytical approach.*
h. Participants in simulation games learn better *decision-making skills.*
i. Participants in simulation games learn *'winning strategies'* in those situations simulated.

3. Changes in the Character of Later Course Work

a. Participation in simulation games makes *later work* (e.g. lectures, reading) *more meaningful.*
b. Participation in simulation games leads students to *more sophisticated and relevant inquiry,* for discussion of the simulation leads to questions about real-world analogies.
c. Class discussion following a simulation will involve *greater participation* by class members, as they will have had a shared experience.

4. Affective Learning Re Subject Matter

a. Participation in simulation games leads to *changed perspectives and orientations* (e.g. attitudes toward various public and world issues, attitudes toward the importance of collective versus individual action, attitudes toward deviant life styles).
b. Participation in simulation games leads to *increased empathy* for others (e.g. national decision makers, ghetto residents) and increased insight into the way the world is seen by them.
c. Participation in simulation games leads to *increased insight into the predicaments, pressures, uncertainties, and moral and intellectual difficulties of others* (e.g. decision makers, ghetto residents).

5. General Affective Learning

a. Participants in simulation games gain increased *self-awareness.*

b. Participants in simulation games gain a greater *sense of personal efficacy and potency.*

6. Changes in Classroom Structure and Relations

a. Use of simulation games promotes better *student-teacher relations.*
b. Use of simulation games leads students to *perceive greater freedom to explore ideas.*
c. Use of simulation games leads to *students' becoming more autonomous,* thus changing student-teacher relationships.
d. Use of simulation games leads to *students perceiving teachers more positively.*
e. Use of simulation games produces *more relaxed, natural exchange between students and teachers.*
f. Use of simulation games leads to increased *knowledge of other students* (by students) and greater peer acceptance (Abt, 1970, p. 121).
g. Use of simulation games involves a *diminishing of the teacher's role as judge and jury.*
h. Use of simulation games leads to *teacher's perceiving students more positively.*

Had enough? All of these represent at least hunches based upon the experience of simulation users. Virtually all of them thus have anecdotal evidence on their side: somebody, observing a series of simulations, has concluded that such and such is happening with his/her students. However, as reviews by Greenblat (1973) and Thorpe (1971) point out, hard data on most of these points is lacking, and some of what is available is methodologically suspect (see also Fletcher, 1971). Still, some empirical evidence has been amassed, and it tends to suggest the following:[1]

1. Simulation has been found to elicit greater motivation (Robinson, et al, 1966) than other approaches, and to provoke high levels of student interest (Boocock and Coleman, 1966).

2. Simulation has been found to produce general affective learning (Boocock, 1967; Inbar, 1970).

3. Simulation has been found to produce affective learning re subject matter (Boocock and Coleman, 1966), though not consistently (Roberts, 1975). There is evidence of interaction between this and student attitudes prior to simulation (Lee and O'Leary, 1971).

4. Simulation has been found to elicit more favorable student evaluations of the instructor than other approaches (Roberts, 1975; Gray and Walcott, forthcoming).

[1]Studies cited are examples only, but are good examples, and represent the usual findings.

On the other hand,

5. Simulation has not been found to produce greater cognitive learning, when compared to other approaches (Robinson, et al, 1966; Roberts, 1975).
6. Simulation has not been found to enhance the quality of later work in courses in which it has been employed (Lee and O'Leary, 1971; Gray and Walcott, forthcoming).

It must be cautioned that this evidence is fragmentary at best, and we have limited ourselves to political simulations, thus further reducing the total amount of information available. Several of the above propositions are supported by only one or two studies, even then only tentatively or partially, and sometimes the findings are contradicted elsewhere. Some fairly fragile, even impressionistic evidence has been admitted in formulating even such a modest list of findings. However, some of these findings do at least deserve additional comment.

The contribution of simulation to cognitive learning, usually measured as improved scores on the kinds to tests commonly given in classrooms, has not been demonstrated despite some determined effort to find it. Students who spend their time simulating instead of doing something else will probably not learn significantly more—or less—for their trouble. There is some suggestion that factual learning may even suffer a bit, but that conceptual learning may be somewhat enhanced by simulation (Roberts, 1975). But these differences seem marginal. It can, of course, be pointed out that the operational definitions of cognitive learning which have usually been employed (test scores) leave much to be desired in several respects. Certainly the dimensions suggested by Greenblat, for instance, have not been explored fully. But, the negative findings must be regarded as persuasive for now. Instructors who opt for simulation should be basing their choice on the expectation of payoffs in areas other than cognitive learning as it is conventionally measured in the classroom.

Regarding attitude change, two observations seem in order. First, what evidence there is does not always show attitudes changing at all (e.g. Zaitman, 1968). When change is found, it is not always in a predicted or easily anticipated direction. Thus the statement that simulations tend to be effective in stimulating some attitude change is not the same as saying that one can necessarily design simulations to elicit precisely the changes one desires. If we are willing to assume that there is at least a good chance that simulation is indeed an unusually effective device for provoking attitude change, we should probably be willing to accept a responsibility for monitoring our simulations closely in this regard. This would require building some reasonable measures of attitude change into the evaluation procedures (*not*, necessarily, the grading) associated with our simulations.

Second, there is clearly room for considerable debate on the questions of whether teachers should seek to change attitudes as a conscious

teaching strategy. We are not prepared to consider that issue here. However, it must be noted if only to avoid giving the impression that we are unreservedly claiming the potential to elicit attitude change as one of the "virtues" of simulation.

Possible Dysfunctions

The preceding analysis has tended to suggest that the worst thing that can happen as a result of simulation is that the anticipated benefits will not be realized. This, of course, does not exhaust the imaginable possibilities. Let us suggest a few.

1. Misleading cognitive learning. Students' understanding of reality is affected by simulation in at least two ways. One involves the behavioral interactions they engage in with peers. The other concerns the learning of the properties of the simulation model itself. The model, presumably, represents a designer's attempt to impose simplicity and order upon highly complex and variable relationships found in nature. There is a danger that the very simplicity of such a model will be misleading—students may fail to appreciate that the world is normally much more complex than the simulation can be. More seriously, the act of simplification unavoidably produces some distortion. If students imagine the real world to be much like the simulation, they will learn these distortions as "truth."

For example, one of Boocock's (1966) findings from her legislative simulations was that students tended to believe, after playing, that legislators were less inclined than they had assumed to vote their true beliefs, but more inclined to try to please their constituents. This, of course, is not exactly false. On the other hand, it certainly doesn't appear to be the case everywhere, all the time. It is, in a word, an oversimplification.

We would certainly not contend that the dangers of such oversimplification are unique to simulation. They are clear and present in all the teaching that we do. But we would like to direct attention to the way in which such problems enter into simulation, particularly at the design stage. For example, it is no great problem to design a legislative game that will, indeed, convince students that legislators mainly respond to constituents. Simply inform them that satisfying the voters is the key to reelection, which is in turn made the definition of success in the game. Then give them simulated poll data, simulated communications, simulated interest group pressure, or whatever you want, to inform them precisely how their constituents will react to the various decisions the legislators will have to make. Immediately, you will have a chamber of "delegates." Alternatively, you can leave the definition of success more vague, or even encourage students to act on their true beliefs. Then let them be substantially ignorant of what their constituents desire them to do. You will thus get

"trustees." In either case, or in cases falling somewhere in between, a great deal of the responsibility for the impressions formed by students as a result of the simulation will rest with the design of the model, the assumptions it explicitly or implicitly incorporates. Thus we make another pitch for careful design, for going beyond simply putting together models which roughly "look like" something out there in the world, then turning them on.

2. **Attitude change as a result of the above.** To some degree, at least, students may change (or reinforce) their attitudes toward political objects as they find out more about them. Boocock's findings in her legislative game illustrate this: not only did students come to view legislators as more constituent-oriented and less (otherwise) principled, but they tended also to evaluate a career in politics more negatively as a result. This is neither inherently bad nor good. We would only worry were such changes to come about as a result of a faulty, game-induced, understanding of what really happens in the world.

3. **Preoccupation with strategies and rules.** Fletcher (1971) states this possibility well:

> Games tend to involve making pragmatic predictions about how much of a scoring unit can be attained by a given strategy. Games seem ill-adapted to force an examination of the question whether the goal, for instance, of making money is a worthy goal to have, or whether some of the alternative strategies for reaching the goal are bad, regardless of whether or not they violate the rules of the game. It seems possible that game experience might develop in participants an overall sense that values and principles are merely sets of rules, no better or worse than any other sets of rules, and the only way of judging between sets of rules is expediency in the pursuit of goals. Winning might come to be seen as the only, or the clearly dominant, value.

Whether such attitudes would remain game-specific or would generalize to other aspects of individuals' social lives is not clear, even assuming that Fletcher's fear is well-grounded. One would at least expect that the development of such attitudes would occur over time, as students played many games, and played them often. To the extent that this is a serious question, then, it may have to be answered from the standpoint of a total curriculum. If some simulation is good, perhaps—for this reason or for others, including boredom—more is not better. In any case, the designer of a simulation and the instructor who employs it both have substantial control over the degree to which "winning" is narrowly defined and/or uncritically stressed in a simulation.

4. **Interpersonal conflict.** Simulations tend to be very involving, if they are good. Most people who have experience with simulation can recall at least an instance or two when things got out of hand: students came to actively dislike one another as a result of game events, individuals were

driven to tears or withdrawal, or even physical violence. To be sure, such occurrences are very rare, but they do happen. They can almost always be avoided, though, if instructors will monitor the simulations closely, and intervene when things seem to be getting too tense. Those desiring to be fully on the safe side can control problems relating to social timidity, etc., by allowing students who would find simulation threatening (or otherwise unattractive) to opt instead for some other form of coursework. The over-aggressive types, however, will tend to volunteer for simulation and to participate enthusiastically. They should be watched.

This list of dysfunctions is merely suggestive, of course, and others may well find other possibilities to worry about: change in classroom atmosphere may worry some instructors, for instance, as it might tend to affect student attitudes toward the instructor or even the "seriousness" of the course in unwanted ways. An exhaustive list of features of simulation which might bother some instructors could grow as lengthy as our earlier list of features which have impressed other instructors. The simple point is that simulation, like everything else, has its advantages and its disadvantages, and anyone using the technique is apt to discover some of each. However, the balance reported by instructors who have had experience with simulation is clearly weighted on the positive side. Whatever the current state of the research on simulation, the most persuasive evidence available is the fact that large numbers of instructors are using simulation and are reporting satisfaction with the results.

We are not attempting to "sell" simulation here, and some of our fellow enthusiasts might be appalled at the amount of attention we have given to possible drawbacks. We are convinced, though, that the success, however measured, of any simulation is inextricably related to the course context in which the model is employed, to the attitudes of the instructor and students toward the exercise, and to the design of the simulation itself. This makes us extremely skeptical as to the generalizeability of the present research findings, limited as they are. We have been more concerned, therefore, with suggesting possibilities than with making predictions. But we would, after all, urge those who are in some doubt as to whether, or how, simulation would work for them to adopt the only effective strategy for finding out—try it.

III. The Objectives of Simulation

It is not uncommon for someone with some experience doing simulations to encounter, from a colleague, the question, "What is a good simulation for (whatever) course?" The best answer to that is, "It depends on what you're trying to do in there." In part, this answer is recommended because it conceals ignorance, at least for a time. However, it also shows wisdom, in that it recognizes that simulations differ substantially in their foci and, presumably, in their effects. Simulations can portray many aspects of political "reality," but no simulation presents the best possible model of all aspects of any given reality.

In this section, we will attempt to sort out some of the kinds of concepts and behaviors which can be represented by simulations, broken down and discussed in terms of their components. The discussion will be organized, for the most part, according to a levels-of-analysis scheme. This is not, we hasten to point out, the only way this organizing task could be approached. But, we think it is a useful approach to sorting out the goals and strategies of simulation design. Concrete illustrations of each of our types appear in the Appendices, and the reader may well find it useful to refer to them in connection with this and subsequent discussions.

The following scheme is more suggestive than precise. Its categories are not mutually exclusive, as simulations tend to be more complex and more flexible than our categories. We are not convinced, either, that these categories coincide particularly well with anybody's approach to the definition of teaching objectives—although, upon reflection, we have found them to be well enough related to our own approaches as to be useful. In any case, we will break our discussion of objectives down into the following categories:

1. Individual Decision-Making
2. Negotiation and Bargaining
3. Legislative Structure and Process
4. Systemic Models

Individual Decision-Making

Virtually any simulation can teach something about individual decision-making, as the making of decisions by individuals is the main thing going on in most games. The question here is simply one of emphasis. Two considerations are relevant to the discussion. First, a focus on individual decision-making suggests that what is to be learned is something about the kinds of decisions actually encountered by individuals in some real-world context. Thus, for this purpose, simulations which represent collective entities in the form of individual actors (e.g. an individual may play the "foreign office" or the "Supreme Court") are probably less valuable than those which offer a one-to-one relationship between referent system individuals and roles in the simulation. This is certainly true if one is attempting, among other things, to develop in students some empathy for real-world actors. The logical problems associated with the decisional role, however, may be essentially the same in both types of model. But the model which attempts to directly represent the behavior of referent individuals permits the subsequent discussion of the effects of individual-level variables (e.g. anxiety, inexperience, personality) in a manner which can be generalized plausibly to the real world. To discuss the behavior of collective entities in such terms requires the making of some questionable analogies—e.g. the State Department can be portrayed as "indecisive," but that may not mean quite the same thing at that level as the same term means when applied to an individual.

Second, whatever the nature of the model, an emphasis on individual decision-making requires the designer to pay conscious attention to the kinds of variables that students are expected to come to understand. At a minimum, this means that those variables which define the decisional situation must be designed with a teaching objective (either replication of some referent reality or operationalization of a theoretical model) in mind. A suggestive list of such variables would include: the presence or absence of a ready-made list of alternatives for consideration; the nature of available information regarding the outcomes of those alternatives; the availability of means for generating either additional alternatives or additional information; and the quantity and quality of available feedback once a choice has been made.

Decisions imply alternatives, but one can readily vary the amount of effort or expense required to generate them. A simulation scenario can simply provide them—as is often the case with very simple, one-person games, in which the individual simply chooses from among a set of possible decisions, on the basis of some information provided and, presumably, some rules or hypotheses which have been learned. Alternatively, one can provide the scenario or problem, complete with information (or, if you are so inclined, with instructions as to where relevant information might be found), with the burden of formulating plausible

alternatives placed on the student. It will normally become obvious to students, in the latter condition, that searching for alternatives is costly. It requires effort, and it takes time. Since time constraints are likely to be built into any simulation, these costs will be clear, perhaps even to the point where reasonably thorough search will not always be carried out. Instructions can be provided to warn students of this pitfall, or they may be permitted to simply fall in.

The organizational costs of searching for alternatives can best be represented in simulations which are complex enough to involve interdependent behavior. There, time constraints can be enforced by the behavior of other simulators, given the need either to coordinate or to counter hostile acts immediately. Also, the costs of diverting people from whatever else they may have been doing to assist in a decision-making process may become apparent. However, even a simple decision-making simulation which is designed to be playable by one individual can be made to accommodate the representation of some interpersonal or organizational variables, by having a team rather than a single person address the problem. The team may or may not be hierarchically structured, with explicit role-definition and division of labor. Indeed, one interesting exercise is to assign students a decisional task (an out-of-class assignment, if desired), then assign the same people to teams and have them deal with the same problem again. The well-known "risky-shift" phenomenon may be one outcome of this approach--or, depending on how you do it, it may not (see Lamm and Kogan, 1970).

Information regarding the outcomes of alternative choices is comparatively easy to control or vary, and will have substantial effect upon the nature of the decision processes in the simulation. If relatively precise information is available, the decision problems become analytical exercises: known techniques can be employed to optimize the outcomes. If considerable uncertainty prevails, then the problem of choosing becomes more difficult, and the task of finding appropriate criteria by which to make (and perhaps defend) a choice becomes central. In any case, many possibilities exist for the simulation designer. Where alternatives are specified, one can state their consequences precisely--but one can still complicate the problem, by either expressing them in terms of more than one value (e.g. dollars spent, lives lost), or by presenting alternatives whose expected values are close, but which differ considerably in amount of risk involved (e.g. a modest gain with a high probability, as compared with a large gain, but with a lower probability).

Where a simulation faces the decision-maker with the requirement of searching for alternatives, it also imposes upon him/her the need to evaluate them. The designer, who presumably cannot anticipate all of the alternatives available in a complex problem (e.g. a simulated Secretary of State, ordered to make one and only one proposal to the government of Israel), can nevertheless provide useful information. In particular, the

designer can help to guide the search and evaluation process by including precedents, actual or fictitious. A knowledge of what has gone before can be greatly helpful in making difficult decisions—or it can lead to a less-than constructive incrementalism. Either way, precedent can be an interesting input to the decision problem.

Feedback is crucial to decision-making simulations, even though the intent of the simulation is not necessarily to train students to make particular kinds of decisions in the "best" way. Only through feedback, and perhaps some opportunity to repeat the exercise, can the student understand how a decision translates into consequences, and speculate on the possible consequences of choices not made. The most critical element in the provision of feedback, though, is not just the data, but an intelligible explanation of how the data were generated. In other words, the student must understand *why* particular choices led to particular outcomes, and why other choices would have turned out differently. This requires that the model of the "environment" which generated those outcomes be fully explained (and subjected to criticism, where appropriate). Or, where the feedback comes from human actors elsewhere in the simulation, there should be an attempt on the part of the instructor to reconstruct their response so, again, the decision-maker gets an idea of why things came out the way they did. The importance of reconstruction and debriefing will be returned to in a later chapter, but it should be obvious in this context, at least.

The variables associated with individual decision-making can be simulated in a number of ways. As noted, the simulations may be one-person exercises, or subroutines of more complex games. The "costs" of search may, in the absence of a social context, be simply those of looking up material in a game manual or in the library. Or, in the context of a larger game, such resources as staff persons or consultants may be brought into the picture. Appendix 1 provides an expandable example, one which may be anything from a one-person game to an interactive situation. The main point, though, is that care must be taken to attend to the various properties of the decision situation so that these can be systematically taught, both as they occur in the game and as they occur in nature.

Negotiation and Bargaining

Like decision-making, bargaining is inherent in most political activity and in most political simulations as well. While the exercises discussed above involve either the activity of a single individual or, if collective, a cooperative relationship, they do not generally imply bargaining or conflict-resolving behavior. But most political simulations do, in some respects at least, involve such behavior. While the setting may be varied

(international politics, collegial courts, legislative committees, or bureaucratic agencies), most simulation designers seem to view bargaining as central to the image of the referent system which they want a simulation to portray.

The simulation in Appendix II is relatively unusual, though, in that its main purpose is to teach bargaining *per se*, rather than to display aspects of system structure which constrain bargaining, or to impart substantive knowledge of a problem which is often, or currently, bargained about. It thus serves as something close to a "pure" case, and is very likely purer than the kind of simulation most people would find most useful. It does, nonetheless, illustrate some properties of the bargaining situation which should be considered when either designing a model to teach about bargaining, or attempting to develop such insights from the bargaining which has gone on in any game.

A clear definition of the goals sought by each party is necessary for effective bargaining. An individual need not know his/her opponent's goal structure, but must be fairly certain of his/her own. This can most easily be achieved by simply defining the situation for the bargainers, and in a model designed primarily to produce bargaining behavior, that is not a bad idea. However, when bargaining emerges out of the activities associated with a more complex simulation, it is most likely that the issues and positions at stake will have been defined by the participants. Thus the clarity with which these have been defined becomes one item for subsequent discussion and analysis. An additional virtue of requiring students to develop and state their bargaining positions themselves is that it provides a subtle way to introduce research on a substantive issue. Moreover, a greater attachment to positions can be expected from students who have formulated the positions themselves than from those who have simply had them dictated by a game manual.

Any bargaining situation, i.e. a mixed-motive problem in which there are elements of both conflict and potential cooperation, can serve to elicit interesting tactics. However simple the problem, for instance, bargainers must decide whether to pursue a "hard" line, conceding little or nothing but risking failure to agree at all, or a "soft" line, initiating concessions at the risk of being exploited. However, the basic problem can be made more interesting, both to play and to analyze, if the scenario provides an opportunity for one or both parties to inflict some sort of sanction for non-compliance (and thus to threaten to use it), and/or some kind of reward for cooperation (and thus to promise it). In simulations which are closely tied to a referent reality, the presence of such variables will be dictated by that referent system. Where learning about bargaining *per se* is a major objective, the presence of such factors can be varied.

Bargaining situations can be further complicated in several ways. Our example, for instance, introduces an issue on which no agreement can possibly be attained as a kind of preliminary to the discussion of more

tractable issues. The objective is to give participants a chance (1) to experience the kind of frustration that even honest, reasonable people feel when they want to agree, but simply can't, and (2) to discover other issues on which agreement is possible, if they can avoid becoming fixated on the most attractive, but difficult, one. This illustrates an important element of the typical bargaining relationship, but one which is too often overlooked in discussions of the topic: creativity in finding a fruitful issue to negotiate.

Another complicating factor which can be introduced is the presence of more than two parties. While most formal theory pertaining to bargaining assumes two parties, the behavioral complications of having either neutrals, and hence mediators, present, or of having the potential for alliances built in, are interesting and worth exploring. Moreover, the theory of coalition-formation is itself an interesting aspect of the political behavior literature which can perhaps be taught better through simulation than any other way.

Two "practical" aspects of bargaining games deserve mention here. One is that such bargaining is unlikely to limit itself to the classroom unless the simulation is brief enough to be concluded in one session. Otherwise, participants will likely continue the interaction wherever they can. There is really nothing wrong with this, unless you are trying to do a little research on them at the same time you educate them. Indeed, it tends to bring the subject matter a little closer than average to the lives of the students. They should be advised, of course, not to feed any tips to others, who may be waiting their turn to try the same exercise.

Second, in simple bargaining situations, at least, you are likely to have some control over the length of time permitted to the negotiators. This can be creatively varied, so as to create crises, for instance. However, under some circumstances, at least, you may not want to tell the participants when the thing will end. This is simply because in bargaining games (and to some extent in all simulations), behavior can get a bit bizarre on what is known to be the final round. We will deal with this problem at greater length in chapter four.

Legislative Structure and Process

A "legislative" simulation, as the term is used here, is a representation of a collegial decision-making body. This definition is broad enough to encompass not only law-making bodies at any level of government, but also processes in other branches of government which strongly resemble the legislative. Thus, we would place in this category administrative simulations, insofar as the simulated bureaucrats are expected to engage in bargaining and policy decision-making in addition to, or instead of, such activities as managing others or keeping records. Judicial simulations,

which nearly always represent the bargaining and voting activities of members of collegial courts, would also fall within this definition.

A legislative simulation, since it represents the behavior of individual "legislators" (or whatever), contains most of the characteristics discussed above in connection with individual decision-making and negotiation. But it also will tend to include variables of structure and process characteristic of collegial bodies, and will tend to place considerable emphasis upon them. The features of such a setting may include a committee system, or some equivalent means of dividing labor; formal, perhaps variable voting rules (e.g. a 2/3 vote required for some measures, majority for others); a party structure, or some other stable, visible basis of coalition; some sort of hierarchical leadership structure, with leaders possessing some kinds of formal sanctions as well as, perhaps, some informal leadership resources (e.g. information); and an issue agenda consisting of several, perhaps unrelated, matters, the attitudes and intensities of individuals differing with respect to these matters (thus permitting some logrolling). While the basic decisional and bargaining dimensions remain, specific outcomes will be significantly influenced by structural factors, and learning what these are and how they tend to affect outcomes becomes one of the simulation's main objectives.

With this category, we actually come closer to the thrust of most commercially available simulations than we have been thusfar. We have dwelt upon the other matters at length, though, because we consider them to be building blocks of decent "legislative" games. Indeed, we would recommend approaching the building of one of these by starting with the role requirements and behavioral options available to each potential participant rather than by looking at some overall model of structure. If this difference seems elusive, we stress it only because we have seen a number of simulations which seem to decently reflect the structure of some system or other, but which do not turn out to be very interesting or useful in practice because the individual roles are too often either barren of interesting possibilities, or badly distorted in order to fit the simple constraints of the model. It is students we are teaching, and they play individual roles, so start there.

In any case, though, the main purpose of the "legislative" simulation is to portray the system, and this can basically be achieved through a combination of the kinds of variables listed earlier in a manner decently reflective of the particular structure being modeled. Of course some systems have peculiar characteristics which are very difficult to simulate: how, for instance, can you reproduce the "power" of a veteran committee chairperson, or the norms of a judicial body. Suffice it for now to say that you can give it a try. For specifics, see the next chapter.

Systemic Models

The distinction between "legislative" and "systemic" is in one sense so subtle as to be artificial (legislative models are, of course, systemic or subsystemic), but the meaning here is fairly straightforward. Where the legislative models preserves an approximate one-to-one relationship between students and simulated individuals (e.g. Student X plays Senator Heartbleed, or at least a prototypical "liberal" role), in a systemic model the student plays the role of an institution. International politics simulations, where national decision-making systems are represented by anywhere from one to five actors, are a good example of this. Large organization processes are, in these models, reduced to individual or small group behavior. The plausibility of such models for scientific generalization may be questioned, but the teaching application does not really depend upon any belief that large organizations really behave like individual students. The objective is simply to provide for the students a sense of system structure and process.

Curiously, one implication of the difference between systemic and legislative simulations is that the former require less care in realistic role definition. The plausible fear of distorting for students the role of, say, a Congress member, is less threatening when one realizes that the simulation, however good it may be, is taking the heroic leap of having one Sophomore act as the Russian military establishment. In other words, the focus upon individual and interpersonal behavior which we value so highly in the other models discussed here is simply less valuable in this case. Such simulations, then, can be designed with institutional relationships primarily in mind, and with the intent of portraying such gross relationships and introducing the kinds of resources which are employed by the institutions in question, the kinds of policy options which they may face, and the sorts of difficulties they have with one another.

The fact that institutional behavior is not all that much like interpersonal behavior should, of course, be noted in discussing the simulation. One additional precaution which can be taken to prevent interpersonal attitudes and skill from overwhelming the structural relationships you are trying to focus upon is to make sure that the simulation is conducted on a relatively impersonal basis. You can, for instance, forbid face-to-face communication for the most part, relying instead upon written notes. Physical separation of the players can also work to this end—indeed, they need not even play at the same time or in the same place, as long as communication via note or some equivalent is sufficient to carry the game along.

Conclusion

The message of this chapter is simply that each designer or user of simulation should give some thought to exactly what is supposed to be learned from a simulation before designing or choosing one for the classroom. Our breakdown of simulations by level of analysis, more or less, is intended mainly to be suggestive of the kinds of questions one might ask prior to deciding upon a particular approach to simulation. At the very least, we hope that the foregoing typology is convincing on the point that there is no simulation that can plausibly claim to teach "everything" about a particular referent system, or to be in every way the "best" simulation of it. What is best, to repeat our earlier suggestion, depends entirely upon what you are trying to achieve.

IV. Elements of Design

Up to this point, we have discussed what a simulation (game) is and what it might be used for, and we have urged a sense of modesty about what it is likely to achieve. But we have not dealt with the question of how one builds such a thing. Without getting overly specific ("connect variables x and y with causal linkage b. . ."), we will now try to become practical. To begin, we will present an overview of the "stages" of simulation development, a rather neat approach which is useful as long as it is not taken entirely literally. Like most discussions of the "logic of inquiry," this description of simulation design is more normative than descriptive of practice; but one should still try, within reason, to emulate it.

Stage One: Theory

A simulation is, to repeat, an operational expression of some interrelated assumptions about the working of a behavior system. Thus, the logical first step in design is to specify the theory or model which the simulation is intended to represent. This is essentially the same thing as specifying a teaching objective, in the traditional sense (where objectives refer more to content than to skills). The point is that simulation does not permit the use of such vague objectives as "teaching about Congress" or "the structure and functioning of the international system."

In this sense, teaching via simulation (especially if you design them yourself) is quite a bit more demanding than normal lecturing. Lectures, some of the time at least, can be highly eclectic. An array of facts, judgements, hypotheses and speculations can be topically organized and presented without any particular coherent theoretical point of view being expressed. Simulations, though, precisely because of their limitations, cannot simply be representative models of just about anything (or everything) that might be associated with a particular referent system. Simulations must be simplifications, and the rules for choosing what is left in and left out must reflect some conscious theoretical judgement. This, we should note hastily, does not presume any better "theory" than the discipline and its various subfields now possess: theory, then, can mean

simply a point of view, a set of assertions (and reasons) identifying the most important variables in a system and suggesting the ways in which they may be related.

Selection of the theoretical perspective to be presented is, of course, optional, and need not simply reflect an instructor's judgement as to the most elegant or plausible theory. The simulation occurs in the context of other teaching, and may be designed or chosen to reflect a particular perspective primarily because simulation may seem an especially good vehicle for getting across one point of view (e.g. a bargaining model of policy formulation, as opposed to one stressing cost-utility estimation), whereas some other approach may look better for other points of view. The teaching of perspectives other than those embodied in a simulation is certainly not precluded. Furthermore, few simulations will be so narrowly theoretical as to reflect only one theoretical viewpoint to the exclusion of all others: behavior in any decently complex simulation will be interpretable in any number of ways. Here, we can distinguish the role of theory in design from the role of theory in implementation. The interpretation of simulation activities and outcomes—which is where much of the learning should take place—need not be as constrained by requirements of theoretical consistency and coherence as the design of the model was in the first place.

Stage Two: System and Environment

Simulations represent only parts of any given system or set of systems. The parts represented are those in which the actors actually behave. However, in order to supply a relevant context for this behavior, elements of the system not represented by actor behavior must be reflected at least generally as static or dynamic (programmed) elements of the model.

The static approach is simply to describe the environment in an initial scenario statement—e.g. to introduce an international simulation by describing existing alliance structure, history, the state of technology, and so forth. All of this serves only as a backdrop to the action, unaffected by the activities of the players, and constraining them only passively. A dynamic approach, on the other hand, requires the development of rules whereby the environment responds to the actions of the players in an active way. For example, the outputs of a simulated legislative appropriations committee (live actors) could be "acted upon" by a simulated "full" house whose response is determined by a set of rules reflecting the typical behavior of such bodies (e.g. the House cuts, the Senate restores; some agencies are more vulnerable than others; big increases and new programs are risky, etc.), with the exact reaction of this model dependent upon the exact outputs of the committee plus, perhaps, a chance factor.

Decisions regarding the elements of the system to be represented by live players or specified by rules (models) will depend upon the level of

analysis at which the simulation aims, as well as the number of players available. Simulations can be designed with components which can be represented by a model or by live players, depending upon the numbers available. The choice between a static environment and a dynamic one is in part a decision about the relative stress one wishes to place upon relations between the system and its environment as opposed to internal system processes. For instance, if one simply wishes to focus upon committee bargaining and logrolling, in the above example, one could have a static environment (described as having certain propensities, but never needing to act) as the setting for a committee which considers a wide range of topics, each of them only once. If, however, one wishes to illustrate the development on the committee of a strategic posture toward the rest of the legislative body (e.g. striving for a high success rate), one could have them consider only a few issues over several iterations, with an active environment providing feedback. A dynamic environment, needless to say, is harder to design, requiring a more complete understanding of the system being modeled. It is also, however, extremely interesting to work on. Moreover, if your ego can take it, you can get excellent mileage out of putting the students to work criticizing your dynamic models (they will find them oversimplified, for openers) and creating better ones on the basis of their own understandings.

Stage Three: Rules

Coleman (1968) has provided a useful taxonomy of rule types for simulations. The most pervasive type, he notes, is the *procedural rule.* Such rules govern the sequences of events, the order in which various aspects of the game are pursued. Standard rules of order in a parliamentary body fall into this class, along with specifications such as "first, hearings, then negotiation among the members, then a vote."

The second class of rules are described as *mediation rules.* These govern the resolution of conflicts. Voting rules (majority, unanimity, etc.) fall into this class, along with structured opportunities for mediation (e.g. the role of the International Court in a world politics game). Here, the line between mediation and procedure blurs a bit.

Third, Coleman identifies a class of rules which he calls *behavior constraints.* These rules define the roles of the various actors. They specify what particular actors may and may not do (e.g. who may vote on an issue, who may negotiate with other teams, etc.) as well as the assignment and disposal of resources (e.g. a lobbyist in a legislative game may be allowed to expend certain reserves of "influence" which are expressed numerically—she or he may not employ more than is granted, nor may the "influence" be used in certain ways). The degree of specificity of these role definitions will vary according to the kind of system being represented and the purposes of the simulation.

Goals may be conceptualized also as rules. Games normally provide players with objectives to be sought, and thus criteria for determining relative and absolute levels of success. These may be specified very precisely, only generally, or quite vaguely in cases where part of the participant's problem is to determine appropriate goals. Alternatively, participants may be required at the outset of a simulation to define their own goals, but then be held to them as criteria to be met through subsequent actions. The difference between a goal and a behavior constraint is that the former are less apt to be binding, more apt to be figured into the evaluation of success, and more apt to be subject to change during the course of the simulation.

Environmental response rules relate to the possibility, discussed above, that the environment may be programmed to interact with the players. It should be noted that while such rules must be completely specified, according to appropriate theory, it is not necessary that the players fully understand the operation of these rules. Technical details should ultimately be explained, but that can sometimes wait until after the game has been played. For immediate, practical purposes, a general understanding of how the environment can be expected to behave is often sufficient, or even desirable. After all, real political actors have to get along without completely specified models of the behavior of their own environments.

Finally, Coleman notes the usual need for some kind of *police rules* which state the consequences of breaking the game's other rules. While it is certainly best to enter a simulation with some idea of what you will do in case rules are disregarded, it is normally unnecessary and probably undesirable to emphasize such rules. The students will normally understand that rules make the game possible, and most "police" activity will consist of clarifying ambiguities.

The Representation of Variables

Guetzkow (1963) has distinguished between "programmed" variables (i.e. those referred to by rules) and "unprogrammed" variables, which are allowed to emerge during play. An analogous distinction, relevant to simulation design, is between variables which, whether their relationships are programmed or not, are represented in some sort of game-relevant currency, and those which are not. A good conceptualization of simulation as exchange behavior is offered by Coleman (1968). If we view game processes as a series of exchanges, i.e. of money, influence, or of the formal means of controlling others' behavior or outcomes, we are led to inquire as to how to represent such variables and relationships in any particular model.

A common answer to this question is to reduce many game-relevant relationships to a common currency, often expressed as "points." For

instance, the influence of a lobbyist over a legislator can be viewed as containing several dimensions. Some of these may be programmed, but others may not be. Individual persuasiveness, for instance, cannot really be programmed. But potential control over the outcome of the legislator's next fate in the next election can be programmed. Since the "next election" is probably an element of the environment governed by formal rules (i.e. outcomes are produced on the basis of inputs from various actors, plus, perhaps, a chance factor), some formal representation of the lobbyist's influence is required as an input. Points provide a handy way of accomplishing this.

The lobbyist may, for instance, be assigned a certain number of "influence points." These points (positive and negative) may in turn be awarded by the lobbyist to legislators according to his/her interest in helping or hindering their reelection prospects. The lobbyist may use these resources explicitly in bargaining with legislators. On the other hand, legislators have certain controls over lobbyists, such as discretion over whether they will be invited to testify before a committee, or even speak to an individual. Since these kinds of controls probably will not interact with any formal evaluation, via a set of rules, of the lobbyist's success (what bills pass will more likely determine this), such controls can simply be indicated in the rules of the game, and need not be represented by points.

But the most important resource a lobbyist is likely to have is expertise. The quality of a lobbyist's presentation, the persuasive content of it, is apt to be more decisive than anything else. There is no need to program this at all. It simply emerges (or doesn't), and must be evaluated subjectively by the participants. This is not to say, however, that the game director has no control over such things. Expertise can certainly be provided, in the form of access to reading materials, special lectures, or any other appropriate medium. The particular advantages of certain roles (e.g. lobbyist, or perhaps Committee Chairperson) can be made more "real" by providing for differential access to useful information.

In general, then, influence or control relationships may be expressed via three types of devices: 1) points, which enter into some formal mode of evaluation, and which can be assigned by one actor to another, or by a preestablished rule (such as awarding points to a legislator for successfully carrying a bill), or by any other mechanism devised by the designer or instructor; 2) procedural rules, giving one actor or set of actors control over the behavior options available to another; and 3) interpersonal interaction, or communication via formal channels, which may include information relevant to 1 and 2, but need not.

Points, incidentally, need not be general-purpose, i.e. capable of being reduced to a single utility scale, expressing the "outcome" of the simulation for any actor. The only requirement is that the points be functionally related to some formal evaluative mechanism, and that the

participants have a reasonable grasp of the nature of such relationships. A legislator, for instance, may receive points from interest groups and also from the electorate at large, all of which combine to yield a probability of reelection. The same individual may also, for instance, receive another set of evaluations from colleagues, reflecting peer esteem, or legislative influence as perceived by colleagues. Since the instructor may well regard these dimensions as independent, it is not necessary to combine them into a single "success" measure. Indeed, the degree of association among measures of this sort could be an interesting question for students to investigate. Do legislators who are highly regarded by their peers also tend to do well at the polls? If so, why? Questions of this sort can be converted readily into class or individual research projects, using simulation process and outcome data. Since a simulation with a reasonably sophisticated set of evaluative mechanisms will be highly productive of quantitative data, it can well set the stage for exercises in the analysis of same.

The primary reason, however, for stressing evaluation so heavily when discussing the representation of variables is simply that role definition, especially in a simulation, is largely a function of goals and incentives. Players must be constrained and motivated in the simulated social environment, and the most effective method is through specification of objectives, and hence through some mechanism which measures goal-attainment. None of this precludes allowing players to have substantial input, at the outset of the game or even part of the way through it, to the definition of appropriate goals for themselves. Plenty of leeway is possible in determining how goals are to be established, as well as in deciding their specific content. At some point, however, they need to be fixed in order that subsequent behavior can be consistent and purposeful.

If all of this sounds like more work than it is worth, however, we might as well mention that it isn't really necessary that you *do* all of it. Actually, you needn't evaluate the students to death—or even at all. It is only necessary that they *think* you are doing it. By the time they learn otherwise, of course, the game will be over. Still, you will then be stuck with the task of explaining to players who want to know the score that none was actually being kept. But, if you can talk fast and have good rapport, you could even convert this into a learning opportunity by asking the players to devise some reasonable score-keeping rules and to apply them retrospectively. The trick here is to persuade them that you meant to do that all along.

Some Difficult Variables

Simulations differ from referent phenomena not only because they are simplifications, but also because the circumstances under which they take place are "special" in certain respects. The simulation designer or user must be sensitive to these factors in order to either minimize or

compensate for them in game design, or in some other way to overcome the potential for misleading students that they contain. In the following section we will discuss some of these special characteristics of simulation. Then, after identifying some of the possible difficulties, we will review the list, discussing strategies for coping with these problems.

History. Relative to the real world, a simulation begins as a blank slate. Decision-makers are students, newly introduced into an environment. They are not always completely familiar with the rules which will formally govern their behavior. Neither are they always entirely sure what their goals are or ought to be—and to the extent that they have formulated an explicit set of goals, these probably reflect instructions or cues supplied by the instructor or the game more than they do the students' personal values or commitments. Often, they simply have decided to try to "win," according to the definition of victory supplied by the situation. While some of these conditions may reasonably simulate the circumstances of real actors (freshman legislators at the start of a session, for instance), they generally create an atypical situation, especially when all participants are similarly afflicted.

We can specify in more detail some of the properties of most real world situations that seem to be lacking in most simulated ones. First, there is expertise. Students are trying to learn something about coping with a particular environment. Almost by definition they lack relevant knowledge and skills that would usually be possessed by their real world counterparts. They will learn to manipulate the situation to their advantage in time, but there will be at the outset much floundering, much experimentation and exploratory behavior, and much unpredictability. This will tend to be true with respect both to technical expertise (as when they try to formulate priorities in a budget concerning activities they barely understand, or to cope with parliamentary procedures), and interpersonal expertise (e.g. logrolling, or persuasion).

Second, patterns of social experience will be lacking. Real world situations most often bring together actors who have interacted before and thus are known to one another and are somewhat predictable in their behavior. Simulations typically bring together strangers, or at least individuals who have not dealt with one another in a similar context before. One cannot reliably "key" one's behavior to that of another, at least for a while.

Third, decisional precedents will be lacking. Complex tasks are often rendered intellectually and practically manageable by referring to how they have been handled in the past. One may inspect previous budgetary outcomes to get an idea of how the present budgetary problem might be solved, for instance. Or, one may adopt particular patterns of conflict-resolving behavior (consensus-seeking, coalition formation, deferring of issues, etc.) if they are known to have served well in the past. Actors in a simulation simply lack such precedents since they have never been in such

a situation before, nor are they likely to be very familiar with the coping procedures of those who have been there.

Finally, if one is willing to put any store in personality theories, one may suspect that certain types of individuals will tend to turn up regularly as political actors, while others will be found only rarely. It is rare, for instance, to find political candidates who are genuinely afraid to speak before a group, or diplomats who cannot help presenting themselves in an abrasive manner, or French Presidents who feel that nationalism is the cause of most of the trouble in the world. But one will find all of these and more in the average class, and one will also therefore find them in the simulation. Certain selection processes, operative in the real world, do not exist in the history-less world of the simulation.

Time. Some simulations are run in "real time." They may simulate a committee meeting, for instance, that tends in the real world to last just about as long as a simulation session. But other simulations, most notably those which seek to represent complex systems via simplified models, will be forced to compress time radically. International system simulations, for example, typically compress real world periods of months or years into a single simulation session of an hour or two. The advantages of such models are obvious: one can concentrate on the outlines and dynamics of the system, represent complex events such as international crises conveniently in the classroom, etc. But there are costs, as well.

The most obvious cost incurred through compression is to the complexity of the events or issues under simulation. Try to imagine simulating the Watergate hearings. The sheer volume and complexity of data would almost certainly overwhelm most students, but even if it did not, the time required to go over all of it would be prohibitive. One could attempt to produce some plausible analogy of manageable dimensions, but much of the richness of detail would have to be sacrificed. Or, consider trying to replicate the Arab oil situation. The economic complexities of the international system would certainly have to be heroically simplified in order to be grasped and manipulated—but how much of the system structure and the issues at hand would survive such simplification? If structures are complex to begin with, and time is constrained, something has to give.

More importantly, perhaps—since reasonably clear-cut issues, even if not the ones you really wanted, can normally be found—time constraints interact with decision processes. A quality of reflectiveness or patience, often found in real world processes, has a hard time emerging under what are in effect built-in crisis conditions, wherein the system will break down if decision, however difficult, are not made quickly. Systematic analysis, search for alternatives, consideration of the implications of those alternatives for values—in short, the kinds of activities normative theorists of decision making usually value—will not very likely emerge. Moreover, systematic processes of perceptual distortion may occur.

Time is salient in another way, as well. Simulations have to have end-points. The real world may just go on running indefinitely, but simulation participants know that their "world" will end before a specified time (e.g. the end of the course), and they cannot be expected to act as if they did not know this. They may or may not know the precise termination time, but they can generally estimate it pretty well. Certain options are thus closed to them. Agenda manipulation takes on a different meaning under circumstances where deferring an issue effectively guarantees that it will never get considered. (Of course, legislative committees operate under such circumstances, but even for them, there is always next year). Such options as referring for study, working for reconsideration, or taking an issue back home (to the constituency, the foreign office, or whoever) are generally not open in a simulation. You do it now, or not at all.

Moreover, situations which end at a finite point tend to elicit another special form of behavior, well described by Morton Kaplan in his analysis of the logic of a Prisoner's Dilemma game (1964: 200-202). In the last round of a Prisoner's Dilemma which is iterated several times, when this round is known to be the last, it is most reasonable to attempt to exploit one's opponent. This is because the real cost of exploitation lies in the opponent's ability to retailiate on subsequent rounds. But, if there are no subsequent rounds, there is no such cost. Therefore, play in the last round will differ considerably from play in prior rounds. (Logically, though, assuming both parties understand this, they will exploit on the next-to-last round, knowing that the last round is a lost cause; but, each knows that the other is aware of this, too, and so will exploit a round earlier still; but, each knows the other is aware of this, too, and so . . . exploitation commences with round 1. But real people, fortunately we suppose, do not generally behave like that.) Experience suggests to us that the last round of a simulation is, indeed likely to be particularly confiictual. Players may become ruthless, take chances, and exploit colleagues, since they know fully that there is no tomorrow, and thus no chance to get even. Nor are there continuing relationships of mutual confidence to be preserved. In international system simulations, this expresses itself as a marked tendency to devote the final round to all-out war. In the real world, the assumption nearly always is that there is a tomorrow. For this we can be grateful.

Costs. As student decision-makers merrily blow up the world in an international politics simulation, they are of course aware that nobody is really getting killed. They are thus in a fundamentally different situation from that encountered by their real world counterparts, and they behave differently. This is a dramatic example of a general fact: simulations do not entail the kinds of costs (or benefits) either to the participants or to their values that are inherent in real world simulations. This will be true of virtually all simulations. Simulated Prime Ministers whose parties are defeated don't actually lose good jobs. Simulated union leaders who fail

miserably in their lobbying efforts don't really have to fear being forced to go back to laying bricks. The simulated officials may suffer some embarrassment, or sense of failure, but it is not very much like the real thing.

One respect in which simulators' behavior will probably differ from that of their real world counterparts is risk-taking propensity. Students will often find risky behavior (such as starting wars) attractive both because the costs to them are in any case minimal and because there is a normal curiosity about the consequences of such actions. One normally has no opportunity to observe such events closely in real life. The more sophisticated student will even value the opportunity to explore the dimensions of the simulation model more fully (e.g. the war submodel in an international simulation). And, of course, a willingness to take risks says something about one's self to one's peers. In any case, the likely outcome is substantial lack of correspondence between simulation outcomes and referent system outcomes, and therefore possibly diminished face validity (perceived realism) for the game itself.

The above problem verges rather closely on the most often raised question regarding educational simulations, namely the degree of genuine involvement present among students. If the games don't have real costs and benefits associated with their outcomes, and if behaviors are observably not quite like those of "real people," will students not tend to approach them frivolously? Furthermore, will such student attitudes not tend to diminish or negate the value of the exercise for learning, if not for fun? In all candor, we must answer "possibly, sometimes, to some extent." That may sound a bit overqualified, but much in fact depends upon the students, the simulation, the course, and the manner in which the whole thing is approached.

Culture. We have noted above that typical students will not behave in every respect like typical specimens of *homo politicus* found in nature. While we outlined some of the reasons for thinking this to be so, we did not touch upon culture. This is, of course, a tricky variable for any social scientist to cope with. But let us assume, for discussion purposes at least, that there really are basic differences of values, attitudes, beliefs and personal styles that do serve to distinguish the average German, Chinese, Tanzanian or Peruvian from the average American, irrespective of the institutional setting in which such persons may be operating. If this is the case, then the consequences of it for the educational validity of some simulations are worth considering.

If Americans do not react to the world in quite the manner that, say, Chinese do, can an American student, even one with a good understanding of the relevant history, function plausibly as a maker of Chinese foreign policy in an international simulation? If we tentatively suggest that the answer is at least a qualified "no," then it would seem that we would have little reason to believe that the policy content that goes into the simulated system is reflective of its referent system counterpart, and thus we would

have little confidence in the representativeness of the simulation's outcomes. But it is worth noting that this would still not lead to a conclusion that the simulation is a waste of time. In the first place, the fact that policy content may be atypical (already conceded above on different grounds) does not invalidate learning which may occur concerning the structure of the system itself, or about the general types of problems that actors in the international system have to deal with. In the second place, a sensitivity to possible lack of correspondence in terms of policy can provide an instructor with an excellent take-off point for a discussion of exactly what kinds of differences between the simulated and real world decision makers, and how one might attempt to explain them.

Perhaps a more difficult case involves the simulation of institutions and processes that are entirely indigenous to a culture quite different from the American. Could American students render a plausible imitation of the behavior of participants in, say, a coalition government in Laos, even given all relevant information and a decent set of rules to structure the situation? Or, to take a less "exotic" example, could American students adequately grasp the values and attitudes which underly the performance of British M.P.s or French civil servants? If our answer is at least "not entirely," then could we claim any particular value for such simulations, since here even the "structure" of the system may come off as meaning something quite different to the American students than it means to the real world actors? We will not try to answer that now, though we will offer some speculations in the next section of this chapter. We have, in any case, talked to specialists in comparative politics who firmly believe that such simulations have definite value, as well as to some who do not. Suffice it for now to note that we have, we think, made the strongest case we could *against* the ability of simulation to cope with cultural differences, including the acceptance, for purposes of developing the issue, of some assumptions which are at least controversial. Not everyone is willing to accept the idea that "culture," however defined, matters all that much or, alternatively, that it defies understanding and empathy to the degree that we have implied.

Coping With the Difficulties

The first step in solving a problem is discovering it and admitting that it is there. In simulation, this means acknowledging that some of the above problems will inevitably be inherent in any model you are designing or using. A reasonabl degree of sensitivity, however, should permit avoiding or mitigating some of these problems in the design of the game. The remaining ones can be lived with or, in fact, turned into advantages by the alert instructor. We will say more on that below, but first let us look at techniques for handling the usual problems through creative design.

History. Perhaps the easiest problem to cope with is the absence of precedents. A simulated history of the system under study can readily be developed and distributed as a pre-simulation assignment. If students are making budgets, for instance, it is no problem to supply them with the budgetary "history" of the agency (or whatever) covering the previous several "years." This technique has succeeded very well in introducing classically incremental outcome patterns in an experimental study of budgeting (Walcott, 1971). If the ability of students to see patterns in such data is doubted, or if their willingness to look for them is suspect, the history can be supplemented with interpretations, calling such matters to the students' attention. Indeed, you can go so far as to virtually order students to arrive at certain kinds of decisions, though this is not ordinarily desirable.

In the same manner, simulated legislators can be supplied with "data" concerning previous voting, foreign policy makers can be given elaborate accounts of recent events, and so on. One additional technique is to arm one or more participants with instructions (perhaps from some simulated authoritative source) to open the proceedings with a statement or proposal that clearly derives from the simulated historical pattern, and therefore serves to fix attention on the issues and positions contained therein.

While precedent cannot fully substitute for expertise (either substantive or procedural), it can make their acquisition easier by calling attention to the importance of information. Matters of substantive expertise can also be approached, however, through the homework method. This ancient and sometimes disagreeable technique can sometimes take on new appeal, in fact, when it is linked to simulation. Simulated city council members faced with a zoning problem, for instance, probably know little or nothing about zoning to start with. However, they also know that they are going to have to deal with such problems in front of their peers and their teacher, and they are likely to wish to avoid looking like complete incompetents, at least if that can be avoided without undue difficulty. Under the circumstances, somebody who suggests a couple of quick references that will be helpful will seem like a friend in need. To put it another way, simulation helps to create an impression of "relevance" for course-related materials by furnishing an opportunity to use the knowledge acquired from them.

Requiring, or even just suggesting, that students become familiar with literature concerning the behavior of people in the roles under simulation also can help to overcome the problems of social inexperience, insofar as it provides generalizations useful in anticipating the behavior of others. This effect will be enhanced if it is known that said others have also read the same literature. However, this assumes that the instructor desires that the students behave approximately like typical actors in the real world. Often, this will be the case, but sometimes it will not. There is probably a lot to be gained by placing relatively naive persons in situations whose structure

(we think and teach) tends to dictate or suggest certain behavior patterns and discourage others. They can then discover the impact of structure for themselves. Minimal preparation is suggested in these cases. Then, if things break down, or come out approximating our generalizations anyway, we get the thrill of explaining this and seeming wise. Or, if unorthodox behavior seems entirely successful, all of us, students and instructor, have a good, creative problem to discuss.

Regarding the absence of "natural" selection processes in a simulation, and thus the possibility of mismatching of roles and individuals, there are some remedies that can be tried, though none is guaranteed. One approach is to let the students choose their own leaders. A problem here is that they may not know one another well enough to do this very well, and adequate time for a good simulated campaign may not be available if your purpose is something other than the simulation of campaigns. The volume and aggressiveness of would-be leaders may play a larger role in success than deem desirable under such circumstances. Or, worse, the elected leader may be a fine person, but one who has little interest or commitment to the simulation or who, for other reasons, is unable to perform reliably the tasks of leadership.

Another approach, sometimes feasible, is to allow the instructor to appoint leaders on the basis of a prior knowledge of the participating individuals. Appointing "A" students, for instance, probably insures a measure of diligence, and also serves as a reward for previous excellence. However, "A" students will not always have the requisite interpersonal skills. In any case, for instructor selection to work better than random selection or volunteering, the instructor must know the students rather well.

Other methods of assuring something like capable leadership are equally chancy. Volunteers are an uncertain lot, although some degree of commitment usually accompanies the act of volunteering. Or, one could administer personality or other tests as a basis for leadership selection and role assignment. We have never tried this, nor do we know of anyone who has done it in the classroom, though the Hermanns (1967) have obtained interesting experimental findings indicating that it might be a good idea. Students might resent such an approach, however, unless it is carefully explained and consent is secured in advance.

Overall, while instant background, experience, and effective leadership can never be achieved fully in a simulation, there are ways of approaching these problems which can help to minimize them, providing that this is desired.

Time. Some of the problems of simplification due to time constraints are partially dealt with through the measures suggested above. The presence of a good scenario and some outside preparation on the part of the participants will aid them in coping with complexity under time pressure. However, structures still must be kept fairly simple and

understandable and problems must be reasonably straightforward and not too technical or students may get so bogged down in the details of understanding the situation that they will accomplish little. Since a major advantage of simulations is that they are dynamic models, they must be made to "run" fairly smoothly for their potential to be realized fully.

One option, obviously, is to simulate in real time. Systems can be chosen for simulation which do not, in the real world, consume an inordinate amount of time to get from A to B. Instead of the international system, for instance, one could choose to simulate a summit conference. Or, instead of the whole Senate, one could deal with just a few committees, and circumscribe the tasks imposed upon them. Simulated bodies could then meet almost as frequently and almost as long as their real world counterparts. But the desirability of this depends upon the instructor's objectives: if one is concerned primarily with communicating the outlines of a complex system, then focusing rather narrowly on its parts will not be a particularly attractive option.

Another obvious approach is to expand the amount of class time spent on simulation. Practical considerations of this sort will be dealt with more fully in the next chapter. For now, though, it can be noted that the more time allowed for the simulation, the greater the complexity (or system structure or of issues) that can be dealt with, and the less intense will be the time pressures, at least at the outset.

The problems which arise at or near the end of a game—decision-making under pressure and possible aberrant behavior on what is known to be the last round—are difficult to deal with. A method which in our experience has worked to a degree is to be a little vague about when the end really comes. You can indicate some uncertainty, for instance, about whether the thing will be called off on the last or next to last week of class, while planning in fact to terminate it at the earlier time. Or, you can even be explicitly dishonest and set the official ending one session later than you actually plan to quit. This can reduce the likelihood of last-session war, coup, or whatever, since executing such a move may depend upon the belief that the session being played is indeed the last. However, this can also frustrate the completion of many previously-planned strategies, or inhibit planning in the first place if the timing is left uncertain. The result can be considerable frustration, as students may feel that they have failed where they would have succeeded but for your arbitrariness. Where evaluation has been made highly salient as is very dependent upon outcomes, substantial outrage can ensue. On the whole, it may often be best simply to put up with the final session difficulties, coping mainly by raising the problems and analyzing them afterward.

Another possibility is to divide the simulation into phases which are interconnected, but each of which has its own identifiable outcome. Some outcomes may thus be achieved under conditions where further interaction is (correctly) anticipated. This will relieve the problem of acting like

there is no future for all but the actual last session. On the other hand, it creates even more deadlines, and can thus heighten the perception of time pressure throughout the proceedings.

Overall, while the time problem is likely to emerge in some fashion in most simulations, its form and consequences will vary, depending upon what is being simulated and how. Certainly an instructor would be wise to try to anticipate such problems and cope with them to the extent possible, at least to the extent of keeping the exercise appropriately simple and allowing enough time for the behavior system to develop and become interesting. Time is not only an important source of unrealism in simulations, but a simulation for which too little time is allotted can be a frustrating and unsatisfying experience for the participants, as well.

Costs. How do we get students to realize that blowing up the world, even in a game, is in some sense a serious act? This question is addressed often in informal discussions among exponents of international relations simulations, and the range of suggestions offered is wide, sometimes even bizarre. Forcing the students, as a penalty, to watch a bloody war movie is one of the milder proposals sometimes heard. But it is probably best to begin by acknowledging the reality of the situation: blowing up the "world" in a simulation is serious only in the context of the game, and the students know it perfectly well. The incentives for avoiding such an outcome are not, and cannot be, very similar to those of national decision-makers in times of crisis. Therefore, students are going to blow up the world fairly regularly; their real world counterparts hopefully won't do it at all. In fact, the structure of many international relations simulations actually encourages curious students to experiment with nuclear holocaust. Much effort is expected to be devoted to the building of arsenals, and elaborate rules are provided for their use. Students can hardly be blamed for wanting to know how the "war" routine really works. There is only one convenient way to find out.

If there are such incentives built into a simulation, we can address them with two kinds of response. One is simply to accept this element of unreality as given, hoping that enough is learned about structure and process that an aberrant outcome will not be fatal to the utility of the enterprise overall. Another is to try to build in some incentives that run the other way, hoping to induce some balance. Some of these solutions may be worth experimenting with.

One factor that surely motivates students in a simulation is the desire to "succeed" in terms of some formal set of expectations established in advance. The instructor may exert some control over these expectations by officially defining the goals of the actors. If students are given to understand clearly in advance that avoidance of war (etc.) is an essential prerequisite to success in the game, behavior will more than likely tend to conform to this goal definition. No sanction beyond the instructor's

judgement of "failure" (as distinguished from a grade of "F") need necessarily be employed. In adopting this approach, an instructor runs the risk of allowing too little flexibility for participants in the selection of goals, or of seeming to prescribe strategies that do not match those employed in the referent system. However, some flexibility is possible. One might, for instance, suggest a set of preferred goals and note that, while rejection of these in favor of some other preferences may be acceptable, it will require convincing explanation. Even in international relations, only a pacifist would argue that war is *never* justified, but the burden of justification is clearly on the warrior.

If goals are made widely known in advance of a simulation, a certain amount of social pressure can also be brought to bear in their support. Students will normally prefer to succeed in the eyes of their peers. The instructor can encourage this by stressing that the simulation is a serious enterprise, not to be approached casually. However, the sharing of such a definition of the situation by all students will still be far from certain, and it will take only one or a few to redefine it effectively by pursuing other kinds of goals. In addition, making the actors' goals publicly known in advance entails the sacrifice of a strategic environment in which actors are forced to confront the problem of dealing with others whose goals are not known to them in advance. Where bargaining is to be stressed, this can be a serious loss.

Some instructors attempt to reinforce this effort at goal-definition by tying simulation performance to grades in the course. This can, of course, be a powerful motivating factor. However, in our experience, this tactic usually has not worked out very well. The reasons for this have little to do with game design, however, and will therefore be discussed in the following chapter.

Our general advice, probably useful most of the time, would be to articulate clearly those goal-definitions deemed likely to induce "realistic" behavior, keep them relatively general, so as not to give away too much information about the strategies of others, and admit that there will be exceptions to these general "rules," but stress that they are rare and require special explanation. Then, let the students play and accept the consequences. Aberrant outcomes are not really fatal to the learning experience: much may be learned, at least about student behavior, in trying to understand why, for instance, nice kids like those in your class attempted to destroy all life on the planet. Stifling creativity and enjoyment by making the situation too restrictive or threatening seems to be a more serious risk.

Finally, do the differences between the incentives in a simulation and those in the real world suggest that simulations will not be taken seriously? Normally, no. The objectives of the participants may not be identical to those in the referent system, but there will be some objectives in any event, and they are likely to be pursued with vigor. Any simulator can

relate stories of students calling one another in the middle of the night to arrange coalitions, students going to the library to do extra, non-required, research on some problem that has arisen in a game, or even students throwing anything from insults to punches during the height of their involvement. Indeed, one of the present authors can recall personally participating in the hurling of one unfortunate Game Director into a swimming pool after what you can be assured was a grossly unfair and erroneous ruling. If the oral history of simulation has any validity at all, we need not worry much about involvement. Lack of involvement, when it occurs, seems invariably related to an instructor's lack of ability or willingness to become involved also. If you treat the exercise as a joke, or as a throwaway part of the course, or even appear dubious as to the utility of the technique, students may pick up this attitude from you. Even if you do have private qualms along those lines, it would be well to conceal them, stressing instead the potential benefits of the exercise if properly approached. Some of this can be communicated through the manner in which the game is related to the rest of the course—a subject which will be discussed in the next chapter.

Culture. Perhaps the most useful approach to simulating political processes in non-American settings is to first be sure that the institutional structures and incentives built into the simulation are appropriate. Some of the attitudes and behavior which seem related to cultural assumptions are also accounted for, in part at any rate, by such factors. For instance, the party loyalty of the British M.P. may indeed be in part a product of the British political culture to some degree, but it is also influenced by the structure of the Parliamentary system (cohesion being necessary to keep the government in power), and by the structure of the British party system itself, which tends to make individual electoral success and access to influence more dependent upon party loyalty than in the American case. While the cultural factors cannot be directly simulated, the other variables can.

Beyond that, one obvious approach is immersion. If it is deemed necessary that students understand cultural values in order to effectively play simulated roles, such understanding can be achieved, to some degree at any rate, through intensive study of the culture in question. Indeed, the process of acting out such rules in a simulation can contribute to precisely this kind of understanding, both by promoting a kind of experiential understanding and empathy, and by offering an instructor an opportunity to compare students' behavior with that which might be more typical in the culture under study, and to suggest reasons for the discrepancies which might be observed.

Foreign students or faculty may offer a valuable resource in dealing with problems of simulating non-American cultures. At a minimum, such persons can be asked to coach or to comment upon the behavior of American students—or upon the simulation model itself, for that matter.

Or, if enough of them are available and willing, foreign students can be asked to play a simulation, with American students observing. We have had occasion to use this approach, and have found that American students sometimes consider it valuable. Allowing a third-world student to represent his/her country's position at an international food conference simulation, for example, has at least the value of making the position of such countries more "real" (yes, the problems do exist, for actual people, and they are deeply felt), and perhaps easier to understand and to identify with. This falls somewhat short of communicating distinctive cultural values, as a rule, but it is useful nonetheless.

Conclusion

Careful attention to all of the factors discussed above will not produce a perfect, operating replica of a real world system for your classroom. At best, you will get a decent, potentially useful approximation of that. We think that is enough to justify the effort, since poorly designed simulations have, at worst, the capacity to either mislead students about the nature of the real world or to bore and frustrate them, not to mention wasting their time. In that sense, simulations are just like books or lectures. A well designed, carefully administered simulation, moreover, can contribute uniquely to the success of a course. However, not all of a simulation's success or failure is a function of design. Of equal importance is the manner in which it is used in a course. This will constitute the subject matter of the next chapter.

V. Using Simulation

Let us, finally, assume that you or someone you are willing to trust have designed a simulation worthy of classroom use. Now, what do you do? Here we come to the truly practical issues, the ones that make the last chapter look like stargazing. In fact, we are now at the point where many people begin: the simulation materials are bought and paid for, a determination to use them exists, and anxiety is beginning to set in. While we cannot hope to allay the anxiety fully—after all, you may have just made a terrible mistake—we can try to draw upon the wisdom of experience, direct and vicarious, for some helpful hints.

We would warn, however, that nothing said here is intended to be taken as gospel. In all teaching, it seems that there is nothing that always works, and the oddest approaches can sometimes turn out spectacularly well. In fact, while we will be happy to give you some of our opinions, the main intention behind this chapter is simply to discuss some of the questions which inevitably arise, thus providing some benchmarks useful in thinking things through ahead of time. The chapter will be organized around such questions, beginning with:

When, In the Course, Does One Simulate?

It is easy to distinguish three options here: you may run a simulation at the beginning of the course, at the end, or somewhere in the middle. Each of these options has characteristic advantages and disadvantages, and we shall try to suggest some of them.

A simulation provides students with a common set of experiences which are presumably relevant to the purpose of an academic course of study. These experiences, and the understanding which they may have bred, can then be utilized by the instructor as a continuing example, useful for illustrating a range of points she/he may desire to make. Of course, this is only possible if the simulation is run early enough in the course to give the instructor some opportunities to refer back to it. Perhaps the optimal strategy, from this standpoint, is to run a simulation at the very outset of the course.

Opening the course with a simulation has some other advantages, as well. It is an excellent way of developing acquaintanceships and a measure of cohesion or esprit among a group of students. If further collaborative work is anticipated, this can be very useful. But even if no further collaboration is anticipated, the atmosphere of a class can be favorably affected by an experience in which students come to know and, hopefully, to trust one another and the instructor. Moreover, simulation is generally an enjoyable, even exciting experience, and it can thus foster a positive attitude toward a course. Finally, running a game at the outset gives the instructor the option of running it again, later in the course. This can be an exercise designed to give students a chance to demonstrate that they have learned something, and/or it can help to broaden perspectives by placing individuals in roles different from those they played the first time around.

Of course, playing games at the outset of class has its disadvantages, too. For one thing, it has been our experience that one or two students will frown, snort, and stalk off in disgust, never to be seen again. On the other hand, our lectures have been known to draw the same response. More importantly, if the instructor has any doubts about his/her ability to "put across" a simulation, or if questions exist as to the receptivity of a particular group of students toward game-playing, opening the course with such an exercise probably heightens the risks involved. Students with little background and no opportunity for socialization into the roles and rules involved may feel lost and bewildered, may be unable to get control of the situation and, as a result, may have a generally unrewarding experience. This not only limits the value of the simulation itself, but is a poor way to begin a course.

The value of employing simulation at the end of a course depends in part upon what has preceeded it. If students have been consciously preparing for their roles, even studying the simulation model—perhaps even helping to construct it—then simulation can be a satisfying method of allowing students to integrate and apply much of what they have learned. It can help to focus and to lend a little added significance to other course materials. Without some such preparation a simulation can have some of this effect, but it is more likely to be simply an enjoyable way of disposing of the last few class periods.

The only real drawback of simulating at the end of a course is that little or no time will then be available for discussion and interpretation of what went on. Most simulators contend (and we would agree) that such discussion is extremely important as a way of integrating experience with analytical understanding. At the very least, a period or so should be set aside for this, after the simulation is over.

Running a simulation in the middle of a course is a compromise approach which has much to recommend it. It allows students time to develop some familiarity with the subject matter and to do some specific preparation for the simulation, if that is desired. And, there is time

available after the simulation for reflection and for integration of the simulation experience into subsequent lectures, readings, papers, etc. The only obvious drawback to this approach is that the simulation may not be as salient to the students when tucked into the middle of a course as it would be at the beginning or the end. It can, unless appropriately emphasized, strike students as more of a diversion than a central part of the course. But it is not really difficult for an instructor to give the simulation enough emphasis--mainly, just talking about it a lot, both before and after--to overcome this problem.

Thus, simulating in the middle of a course seems to be a minimax approach, and is generally recommended to instructors who are trying simulation for the first time, or who are not particularly interested in the unique advantages offered by starting or finishing with games. But, obviously, there are potentially good reasons for adopting each of the possible strategies, and we would urge experimentation. Given the great diversity of course content and teaching styles one encounters in our discipline, "fine out what works best for you" is the closest thing to a rule that we dare suggest.

How Many Simulations Per Course?

Our previous discussions may have contained the implicit assumption that each course may contain one and only one simulation, presumably the one deemed "most appropriate" under the circumstances. Of course, there is no particular justification for that. Since simulations may be very brief, and since courses may contain many semi-independent units which can be taught effectively via simulation, there is no particular reason why several games cannot be used.

Students will vary in their receptivity to simulation: some would be quite happy to play games every day, others would sooner not do it at all. But an instructor's decision must depend upon more than just students' overt responses. The key question involves the instructor's beliefs (if appropriate evidence has been collected, so much the better) about the relative effectiveness of simulation for teaching certain types of material. This is a subjective judgement which we cannot make for anyone else.

There would seem to be two possible problems associated with oversimulation, however. The first is that simulation may become an end in itself, rather than one of several approaches to the understanding of a set of concepts or facts. When simulation is integrated with readings, lectures, field work, data analysis, etc., we are firmly convinced of its potential value. But when simulation is relied upon exclusively to teach something, we are less certain. Students vary considerably in their subjective reactions to games, and thus in the quality and quantity of what they learn from them. If overreliance upon simulation leads to under-

reliance upon other instructional methods, there would seem to be cause for concern.

The second problem, alluded to in the second chapter above, is that students might become too game-oriented in their approach to politics and political science. This can mean two things. First, students may become too oriented toward strategy and manipulation, and not enough toward values, as feared by Fletcher (1971). Second, students may get so good at games that they develop an ability to win through "psyching out" the model, quite independent of its substantive content. This isn't bad, except that after a while there may be a tendency to neglect considerations of the referent system and focus entirely on "beating" the game. While we have not seen students who could actually do this very well, we have observed the phenomenon when people experienced in simulation design and teaching sit down to play a game. In any case, fears of this sort may relate less to the use of multiple simulations in a given course than to their repeated use over several courses. If entire departments become simulation oriented, there may, after a while, be a problem of diminishing returns for students who major in the department or take several of its courses.

All of this is merely to say, however, that simulation, like other good things, can be overdone. While it is certainly useful to pay attention to maintaining some sort of balance among various instructional approaches, in a course or in a curriculum, there is nothing inherently wrong with playing lots of games. After all, the other side of the coin is that most of us probably overlecture.

How Long Should a Simulation Last?

This being one of the most commonly asked questions about simulation, it naturally has no good answer. Or, rather, it has the standard non-answer: it depends.

For some simulations, the total amount of time to be committed is fairly obvious, the only question being how to schedule it. A simple negotiation game (see appendix), for instance, shouldn't run for more than an hour or two, since everything one normally desires to see happen in such a game will happen within that time period. (Well, almost everything: extended stalemate can happen, and that takes longer. If you want to simulate the negotiations that have gone into settling the Korean War, an hour or two just won't do.) Certain simulations are designed to last a certain number of periods, and appropriate timing may be indicated for the periods as well. This usually reflects considerable experience with the game, and will attach to instructor-designed games only after some experimentation. With such games, however, the main problem eventually becomes one of deciding whether to run the whole thing in one extended

period (perhaps apart from the regular class hour), or to space it over several periods.

Numerous factors, including normal class scheduling and student availability, will influence the decision whether to run a game all at once or to space it out. Other things equal, however, a good rule of thumb is to run games which have only a single outcome (e.g. a bilateral negotiation) in one extended period, where possible. This prevents participants from losing the sense of strategy, of interconnected, purposive moves which they hopefully will have developed. A game run this way also maximizes the intensity, and thus perhaps the impact, of the interaction. Where simulations have multiple outcomes (e.g. a legislative simulation in which several bills are to be considered, or a continuing system-maintenance problems such as are posed by many international politics games), carrying the simulation over a number of periods may be desirable.

Running a simulation over several periods has its costs in terms of intensity, but the advantages may outweigh this. For one thing, problems of time-compression, notably the difficulty of reflecting on events and putting them into perspective, may be minimized. Also, participants thus gain time to do research (e.g. on substantive issues before a simulated legislature), and to then apply the fruits of that research to their activity. Poor preparation can also be overcome this way. A continuing simulation can also foster considerable out-of-class interaction among students, something which will usually happen anyway, but normally without a great deal of political science content. Finally, if the instructor interjects some lecture-discussion periods between simulation "runs," the simulation can be an especially useful source of examples, since it is an arena of political behavior in which the students are currently, actively involved.

However scheduled, some simulations will confront you with the need to make a semi-arbitrary decision as to when to end them can be made in one of two ways. In the interest of planning the course in advance, one can simply allocate a certain number of class (or out-of-class) periods to simulation, reserving the rest of the course for other things. The game is then halted whenever the last period ends, regardless of what is in the process of happening. This may sound cruel (as in, "Geez, Professor, we were just about to . . ."), but can even turn out to be an advantage, as much interesting discussion can revolve around the question of what would have happened, and why.

The other approach is to remain quite flexible about scheduling, terminating a simulation whenever it seems appropriate to do so. This permits one to let the game go on until a natural break-point is reached, or until everyone involved seems to be running out of steam. This can be more fulfilling to students, and can allow simulations which start rather slowly a chance to get going well. It can also, however, play havoc with the course schedule if you, like we, tend to get so interested in the game that you are reluctant to stop it at all. If you are simulating for the first time,

though, and have no very good idea how long a particular game will take to develop in an interesting fashion, some flexibility as to scheduling is generally advisable.

As a final note, we should mention that it is entirely possible to plan a simulation to last an entire course, making the game the central focus of instruction. For the past several years, the senior author has taught such a course with, as far as can be determined, good success. The course begins with an explanation of the simulation in question, in this case the Inter-Nation Simulation or some locally-developed modification of it. Students then play the game, spending all of their 3-4 hours of class time on it for a period of three or four weeks. Termination time is kept somewhat flexible, since it is important that students have an opportunity to explore many aspects of the simulation. The game always ends with a war, even if the instructors (the course is usually team-taught) have to virtually induce one. This is because the teaching objective at this point is to get students to explore the model—their specific behavior is of less importance.

The second phase of the course, which consumes all but the final week or two, involves revising the simulation. The students, who are admitted to the course on the basis of prior background in related courses, are formed into teams, specializing in particular aspects of the model: the military routines, economic model, domestic politics, etc. They read fairly extensively in these areas, and combine this with their experience as players to develop a revised (usually more "realistic"—and also more complex) submodel. The class as a whole then combines these efforts into a grand, revised model, complete with detailed playing instructions. The final week, or two, if all has gone according to schedule, can then be devoted to playing the new game.

The course, as noted, has worked. Students tend to report that they have learned more this way than in any other way. Everyone enjoys it. The revised simulations have proved good enough to use in other courses, often with the original designers dropping by to observe the results of their handiwork. Although we can't be sure, we think that there are some factors which contribute importantly to this apparent success. The first would be the relative sophistication of the students: they are not trying to learn international relations from scratch, but are far enough along in the field to begin to apply creatively what they have learned elsewhere. Second, the class is small, enrollments ranging between ten and fifteen. A good group dynamic has always emerged, and, with two instructors particularly, there is ample opportunity for tutoring. Moreover, the instructors can operate very informally in such a setting, treating the students like colleagues to a considerable extent. Finally, the simulations we begin with (the INS or a previous group's revision of same—see appendix) are good ones, both in general and for the specific purpose:

they are thoughtfully developed, sophisticated, complex enough to be interesting, yet flawed enough to be in apparent need of change.

One final word on this particular approach: the result is not a "course on simulation." The focus is on empirical theory-building. Playing the game, apart from building group cohesion and stimulating interest, serves mainly to immerse the student in a particular theoretical model. While something is inevitably learned about building simulations, that is not the main point. A course on that subject might be useful, but it probably belongs in a teacher-training curriculum.

What Does the Instructor Do During the Game?

For the most part, this question should have been answered in chapter one, where the role of the instructor as umpire and game manager was discussed. One question remains, though: should the instructor be a player, too?

In general, we would discourage this. First, there are usually plenty of other duties to perform, and the instructor, being possessed of some authority, can probably perform them best. Second, when the instructor assumes the role of player, some problems can arise. For one thing, some of the instructor's usual classroom authority will probably carry over into the game, affecting the simulated relationships into which she/he enters. Only a very vew of us can bring off the Student's Pal approach so well that we will be treated in a game as just another peer. Instead, we will wind up smuggling assumptions and expectations that are not a valid part of the simulation itself into the game. Add to this the possibility that, being competitive and, perhaps, fearing loss of face, we will play the game in such a way that we will not come off as the Student's Pal, but rather as Nasty Charlie.

Furthermore, as we will elaborate immediately below, postgame discussions of the simulation are usually important, and they benefit from the presence of a realtively detached discussion moderator. That kind of detachment will not come easily to one who has recently been involved in the winning and losing. As the very least, we may succumb to the temptation of dwelling overmuch on how cleverly we have played (as opposed to others).

If you still really want to play, though, there may be a role you can adopt with relative safety. Some games provide essentially symbolic roles: a legislative game may begin with a State of the Union Address from the President, for instance, but not involve said President in any active participation beyond that. If so, there is no harm in the teacher playing President, and the students may at least find the role-switch amusing. Alternatively, you can simply dress up the Game Director role and have a little fun with it. One of us, for instance, has the habit of referring to

himself as God, and carrying the questionable humor on from there. That is probably harmless, and, in a way, more satisfying even than being the President.

What Do You Do When the Game is Over?

There is currently some debate among the exponents of learning through experience (field work, etc.) as to whether such experience is in itself a sufficient catalyst for learning to be worthy of credit without an additional component of classwork, reading, tutoring, or some such interaction with traditional academe. While we will abstain from that discussion, we note that there is an analogous issue involving simulation: is the end of the game the end of the particular learning experience, i.e., are simulations self-teaching devices? A cursory reading of what we have said to this point should make it clear that we think not.

When one plays a role in the real political world, one may be limited in understanding by lack of background information, narrowness of perspective, or idiosyncratic circumstance. But at least the world observed is real, and observations of it thus have a certain intrinsic validity. Not so with simulations. Certainly what goes on in a simulation is in a sense "real," but nonetheless the model which forms the environment is an imperfect abstraction based upon a referent system which is the actual object of study, and the actors in the simulation are only pretending to be the kinds of people whose behavior it is important to understand. The transfer of learning from the simulation to the referent system, therefore, is a problematic thing and it requires deliberate attention.

The best time for such attention is immediately after the game has concluded—or at least at the next class session. Memories then are sharp, a sense of involvement persists, and participants are eager to discuss what went on. The usual format is an open discussion, relatively unstructured and spontaneous. But the instructor can certainly enhance the value of this with appropriate leadership. A brief list of topics to be discussed at this time includes:

1. Retrospective statements of goals and strategies by several participants. Students can often get a broader and deeper understanding of what has happened by coming to appreciate better what others were up to. Sometimes this will clarify the various incentives built into particular roles, but often it will reflect mainly individuals' choices.
2. Participants' interpretations of others' behavior. This is a chance for individuals to learn how they were perceived, and to compare that with how they intended to be perceived. Interesting discussions of communication and perception can ensue from this. A danger to watch out for is degeneration into accusations and recriminations.

3. Discussion from an individual perspective of what might have been done differently, how that might have turned out, and why. This type of discussion can begin to get at the operation of the simulation model as well as particular strategies and tactics.
4. Explicit discussion of ways in which the model, or the scenario, constrained or determined particular behaviors or outcomes. Treat assertions of constraint or necessity critically—there will be a tendency to rationalize, particularly on the part of those who did not fare too well. Focus on the interaction between freedom and structure, and the difference between formal constraints and those imposed socially, e.g. by the expectations of others.
5. Comparison between the simulation model and the referent system. Criticism of the model may be sharp, and you will probably want to defend and explain the model, especially if you designed it yourself. But avoid defensiveness and encourage good criticism. When students make such comments, they are making serious applications of their understanding of the referent system, something we usually want to encourage. Moreover, they are in all probability making useful suggestions for modifying the game.

The above list is in a sense an ideal model, proceeding from the personal to the general, trying to build from individual involvement to abstract understanding. Of course, real post-game discussions rarely follow such an outline very closely, though some may in fact approximate it. It is best to keep things loose and allow the discussion to range back and forth, as long as it seems productive. If some of the above topics are not touched on otherwise, the instructor can of course bring them up. And, at the end, the instructor may attempt something of a summary, along the lines of the above topics. So, while the list is not meant to be a script, it can be of use in preparing for the discussion.

As already noted, the post-simulation discussion is not necessarily the end of all references to the game for the rest of the course. A clever lecturer will often be able to work the game experience in as exemplification of many things as the course proceeds. While this can be overdone, it is generally useful, at least inasmuch as it enables one to refer to shared experiences rather than textbook abstractions—to things, in other words, that are "real."

What About Grading?

Students need some sort of incentive to get involved in a simulation and/or to perform seriously in it. For many students in this post-Vietnam (or pre-unemployment?) generation, it seems that only the promise or threat of a grade will suffice. Thus the very common and important

question, how does one evaluate, or grade, the performances of students in a simulation?

An obvious possibility is simply to evaluate how well each student played the game, and grade accordingly. Or, rather, that sounds simple. Actually it is very difficult, and we view the practice with mixed, but largely negative, emotions. But before presenting the negative arguments, let us consider how it might be done. We will use the example of a legislative simulation, since such games usually have fairly clear role definitions and objectives, which facilitate evaluation of success.

In the legislative game outlined in the appendix, a participant has two central objectives: one is to get reelected, and the other is to achieve influence within the legislature. The former criterion is fairly easy to deal with, since a formula will yield the reelection probability for each individual at the end of the game. One could simply use this as a "grade" but for the fact that individuals do not start with equal opportunity for reelection. Some simulated districts are highly competitive, others are not. Thus, an evaluation of success on this dimension would have to control for the difficulty of the problem faced by each legislator. This, however, is certainly feasible, either by elaborating the reelection formula to account for competitiveness of districts, or, more simply, by grouping legislators according to the competitiveness of their districts (e.g. high, medium, low), and looking at their ranking, in terms of reelection probability, within their respective groups. The real problem with this is that you are in effect insisting that each legislator attempt to *maximize* her or his reelection probability in order to score well. This may make considerable sense for those representing competitive districts, but it is not at all clear that this would really represent a sensible strategy for one whose reelection is virtually assured in any case.

The legislative influence measure presents even more problems. First of all, it is a subjective measure, as we have defined it: students simply rate one another. When no grade is at stake, it may be reasonable to assume that such ratings will be more or less objective. But when course grades are on the line, problems of within-clique backscratching and all kinds of trading and bribing could easily become serious. Now, this may represent reality even better than the simulation, and perhaps that is good. But real damage could ensue to certain players, the level of interpersonal tension could get out of hand, and certainly the possibility would exist that the logic of the simulation itself could be submerged in the bargaining over the real payoff, grades.

This suggests two possible alternatives. One would be to drop the influence measure altogether, or at least from the grading. But then the incentives are distorted, at least assuming one feels that the influence factor is really important. The other would be to try to find some relatively objective substitute. One could award points for leadership positions, for instance—but, again, you may just be rewarding those with

lots of friends in the class, and the option of assigning leadership roles would then be precluded. Or, one could count bill sponsorships, votes on the winning side, speeches made, or even just attendance. All of these are fraught with problems, however, when used as measures of influence or effectiveness. To note just one obvious problem, some legislators will, by virtue of their constituency requirements, generally find themselves on the losing side. They may be superbly effective in such roles, but our attempts to count influence would almost certainly miss such performances. Basically, we can see no really good way of handling such difficulties.

More serious than the above problems, perhaps, is the effect that grading according to fixed criteria might have on the incentive to either explore in a creative (some might say "playful") manner the available options, or to take a stand based upon personal belief and conscience over and above role requirements. When doing this risks the grade in the course, it will not often be done—and yet it can be a valuable learning experience, as well as a meaningful chance to express one's self in a political context. On the other hand, of course, real politics does impose serious constraints, and frustration is part of the experience. A case can be made that learning this is worth the cost.

While a legislative game is a particular case, we would suggest problems of the sort discussed here will arise anytime one attempts to grade performance in a simulation. Even a very simple, one-goal model—allocating resources as a simulated campaign manager, for instance—can be played in a fairly rigid, success-oriented manner or in a more exploratory manner, and we are not sure that the former is always or even usually to be preferred. On balance, then, even though grading heightens the sense of seriousness and, in a way, the realism of a simulation, we are inclined to recommend against it. The costs—in terms of narrowness of focus, tension, anxiety, interpersonal wheeling and dealing over grades, and the inherent unfairness of most feasible systems for determining the grade—would seem to outweigh the benefits, at least most of the time.

Yet this only brings us back to the original problem, that of motivation. If performance in the simulation is to be grade-free, how does one get the students to take the matter seriously, to invest their valuable time in it, or even to attend regularly? Sometimes, of course, this just won't be a problem—students will be interested enough to participate for the fun and value of it, or because their peers make them feel that they should play along. More often, though, some kinds of rewards and/or sanctions will be required. There are several things, other than grading performance, that can be done along this line.

The most basic problem to be dealt with is that of attendance. When key actors are not present, things tend to break down. We have tried two approaches to dealing with this. The first is simply to stress the importance of attendance in advance, trying to elicit some kind of group commitment to meet this responsibility and to create an atmosphere in which

non-attenders will be regarded with disfavor. But as a precaution, and with the consent of the class (which can be made to see the reasonableness of the approach), we have also tended to attach a sanction—some kind of grade reduction—for unexcused absence. In practice, this can be a pretty hollow threat, as experienced students can usually get a plausible excuse together when they really want to miss something. But as an assertion of the importance of the simulation, and as at least a not wholly incredible threat, it seems to work well enough.

Beyond simple sanctions, it is often a very good idea to follow up the simulation with a paper in which the students attempt to analyze some aspect of the simulation in the context of the related information they have acquired in the course. This, of course, penalizes absence or indifference effectively. But it can also lead to heightened alertness during the game on the part of students who know that they will be asked to write about their experience later. The nature of the paper can vary. Advanced students should go well beyond the "What I Did Last Week" format, but beginners can be permitted to be impressionistic and anecdotal in their approach. Simulations can be made to generate considerable data, and students with appropriate backgrounds can even be encouraged to try their hands at analyzing this. As an example, the senior author has had some very good luck in videotaping simple bargaining exercises, then training students to do interaction analyses of the videotapes, the result being papers which "test" (in an admittedly loose sense) hypotheses derived from the literature on bargaining and coalition formation. Written messages and voting outcomes can provide other interesting sources of data, and if you have students who want to try using attitudinal questionnaires or any other measuring devices in such research, let them have at it. Indeed, while the use of simulation in methods courses has not, to our knowledge, become popular, there is an argument to be made for it.

As an elaboration of the above, we have heard it suggested that students in methods-oriented courses might be encouraged to collect data from simulations being run in other courses. This would, of course, require mutual consent, but it would seem to be a feasible and interesting idea, especially where access to natural data sources is limited and something more than secondary analysis is desired. There could even be opportunities to work with experimental design in such circumstances, as long as everyone involved could be satisfied that this would not interfere with anyone's education.

In any case, a paper is generally a good idea, and is certainly preferable to a test. The latter would seem to have too much potential for reducing the simulation experience to rote learning or, if that is avoided, it would still seem to present insufficient opportunity for reflection.

Finally, as we have suggested before, the follow-up to a game need not end with a particular session or assignment. And, since an effort will have been made to integrate the simulation with other learning, there is no

reason why students cannot be permitted or even encouraged to refer to the simulation to exemplify generalizations on subsequent tests or papers. We stress this kind of continuing reference to the simulation simply because we have noted in the past a tendency to isolate the simulation from the rest of a course. It is a tendency that we have had to cope with consciously, and it is worth worrying about, since some of the value of a simulation can be lost if the game experience is allowed to stand apart from the bulk of the instruction in any course.

How Can One Tell Whether the Simulation Has Been Successful?

Most simulators regard their efforts as successful most of the time. They are probably right but, as we noted much earlier, this is hard to prove. For now, though, we will not be specifically concerned about formal research, directed at the scholarly community, but rather with the subjective convictions of instructors. In other words, presuming that one approaches simulating with a modicum of healthy skepticism, how does one satisfy oneself that the effort has been worthwhile?

There are, first of all, some obvious clues—but they are generally to be distrusted. Smiling faces, for instance, or expressions of enthusiasm, will tell you that the exercise has been enjoyed. But that is not necessarily to be equated with learning. Frowning, frustrated participants may well have learned more of lasting value, even though it may take them a while to realize that. Immediate, postgame reactions, in other words, do not necessarily provide good evidence about learning.

The same warning should be sounded with respect to course evaluations. As we noted in our earlier discussion, simulation participants will tend to respond, when asked, that they enjoyed the simulation, that they thought they learned from it, and that they appreciate the teacher for permitting them to have such an experience. None of this has been found correlated to objective measures of learning with any consistency, despite substantial efforts. Again, such responses primarily reflect the fact that most students find most simulations enjoyable. There is considerable intrinsic value in this, of course, but that is about all that can be stated confidently. Moreover, students who are not accustomed to simulation may overreact in a favorable direction simply because they generally appreciate instructors' efforts to innovate—the "Hawthorne effect," so-called. This is not a non-finding, since there may well be a cumulative effect of such experiences on students' attitudes toward education in general or the discipline in particular. Yet, it is still not the same thing as learning in the short run.

What, then, is the answer? Unfortunately, we have no magic formulas. But we can make a few suggestions. First, in coursework subsequent to the

simulation, look for integration of simulation learning with other material. In writing and speaking about the subject matter of the course, do students utilize simulation events as examples? This applies not only to direct application (what happened in the game proves, or illustrates some point), but to critical reactions (a point is illustrated with reference to some inadequacy in the game model, or some aberrant student behavior). If the simulation is serving as a kind of "hook" to hang conceptual or factual learning upon, or as an independent source of information or generalizations, it should show up in these ways. Of course, this is more likely to happen if it is encouraged.

Second, are students communicating more, within or about the course? Simulation should not only break down social barriers, such as unfamiliarity, but should interject course content into interactions among students. Any carryover beyond the simulation should be taken as evidence that the simulation has at least positively affected the learning environment.

Third, look for evidence of a continuing interest in simulation. Do some students request simulations in other courses, or experiment with them outside of class? Do they start designing their own? Do they take another of your courses in hopes that you will do it again? In part, of course, this reflects the kind of fun experience we warned about before. But it is at least stronger evidence, in that it indicates that students are getting aggressive in seeking out or creating a kind of intellectual experience. In some colleges and universities, this is not big news. In others, it is remarkable.

Fourth, instructors should simply trust their instincts and judgements. If the simulation was decently designed, if it articulated well with the content of the course, if it played well, eliciting interesting and appropriate behavior, if the post-game session suggested that learning occurred—if, taking all of these things and more into account, the instructor is satisfied that the time was well spent, then it probably was.

We have suggested here some relatively non-rigorous ways to ascertain whether a simulation was useful. This is by no means intended to discourage more rigorous research. There is still a substantial need for carefully collected evidence about the effectiveness, strengths, and weaknesses of simulation. There are certainly outlets for such research, and there is a healthy literature from which to proceed. Whether or not the results of such research turn out to be the most satisfying means of convincing individual instructors that their efforts have (or have not) been worthwhile, they can certainly contribute to the general understanding of the phenomenon.

When Should One Try a Different Game?

The obvious answer is that one should change games when either (a) the game currently being used doesn't appear to be working very well, or (b) the instructor or somebody else appears to have a better idea. Beyond that, experimentation has a broadening effect. Particularly for one just beginning to simulate, exposure to a variety of games can lead to the development of expertise and firm preferences.

However, there are drawbacks to such experimentation, also. Particularly when an instructor is designing his/her own games, but even when the works of others are employed, there comes to be a considerable investment in getting the thing to work right. Rules, for instance, are seldom entirely unambiguous. The first few times you run a game, you will probably find yourself improvising to deal with such ambiguities. (The best technique here, by the way, is simply to make the best interpretation or improvisation you can, call it the law, and get on with things.) After a while, you will come to have such things firmly in hand, and all will go more smoothly.

With self-designed games, there are even more problems. Commercially-produced games will at least have been tested, and some, if not all, of the bugs will be out. But any new game requires some shaking down, some clarification and modification, which can only come from repeated use and evaluation. Once you have a game to the point where you and the students are happy with it, it may be hard, and it may even be unwise, to change.

Such decisions will have to be made according to taste and circumstances, of course. It is at least good to be aware that debugging and familiarization will present problems at first for just about everyone. If all does not go well the first time around, relax. You are not alone.

Does Simulation Require Special Facilities?

Basically, the answer to this question is no. If all that is available is an average classroom, many simulations can be run there. Even simulations requiring subgroup interaction can be fit into a large lecture room by having the groups go to the corners thereof. It is very useful in those cases, though, to have smaller, adjacent rooms available. Space requirements vary with the simulation that is selected or designed. One of the advantages of designing your own, incidentally, is that it can be tailored to the available facilities.

Certainly a more elaborate facility, even a special simulation laboratory, is desirable if you can get one. This makes audio and video recording more feasible, and these can be useful in reconstructing, for and with the students, what went on in a simulation, as well as for generating

interaction data. TV cameras, if you have them, can even be used to monitor the games without conspicuously moving about. Intercoms are nice, too, for certain types of games. If such capabilities are available, it makes sense to design or adapt simulations so that they can be taken advantage of. For suggestions along this line, see the description by Noel (1969) of a truly elaborate lab, designed specifically for simulation.

The main point here, however, is that an active simulation program can be carried on quite well without all of that. Indeed, setting up a lab before a program has been developed and implemented may be putting the cart before the horse.

Conclusion

Simulation is a flexible instructional tool. It can be adapted to a wide range of classroom subject matter, and an equally wide range of students and facilities. It even can have applications beyond the usual classroom setting. For instance, it may be possible to persuade living groups or social organizations on campus to play around with simulation as a painlessly educational pastime. We have even heard of an instance where simulation was used during a period of campus tension to try to get disaffected students, faculty and administrators talking meaningfully together once again. Simulation can bring separate classes into interaction, as when one class collects data on the simulation activities of another, or when one class plays the legislature and another the executive branch. It can even bring campuses into interaction, via games played through telephone-computer hookups. It can be used to prepare students for internship experiences. And so on, and on. The potential may not be limitless, but it is large.

However, simulation is only an instructional tool. Throughout this volume, we have tried to eschew excessive boosterism in order to preserve that perspective. We do not particularly care to hear about the simulation "movement," or to read the testimonials of those who "believe in" it. We "believe in" it, certainly, but in the same sense that we "believe in" lecturing and in assigning reading materials. It is one of the things one can do to help and encourage students to learn. One does not do it for its own sake.

It is for this reason that we have stressed the subordination of simulation design to substantive instructional goals. And, since such goals tend to differ according to courses, students, and instructor, we have advised that teachers may want to consider designing their own games rather than relying upon the possible appropriateness of simulations designed elsewhere for other people. Still, an instructor who is just beginning to experiment with simulation could do worse than to start with a professionally-produced model, just to get some experience in understanding and coping with the technique before proceeding to innovate.

The main point is simply that care must be taken to assure that the simulation contributes to a coherent intellectual experience, that it is not simply a gimmick.

Beyond that homely philosophy, about all we can add is good luck, and enjoy yourself.

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Annotated Bibliography

The following is a relatively brief list of selected references which we consider to be the most useful of the published materials on simulation and games. It is not a comprehensive bibliography, but it will indicate where such bibliographies can be found. Since the field of simulation/gaming is still developing rapidly, the most important resources may be the periodicals which reflect current developments. Some of these will be noted at the end of this bibliography.

Teaching with Simulations: General Introductory Works

Abt, Clark, *Serious Games*. New York: Viking Press, 1970. A good introduction to the logic and potential of gaming, written by a veteran designer. Contains valuable insights, despite the fact that most of the examples discussed are not specifically applicable to political science, or to college students.

Barton, Richard F., *A Primer on Simulation and Gaming*. Englewood Cliffs: Prentice-Hall, 1970. A good, non-technical introduction to a variety of computer simulation techniques, with attention to teaching applications. Relatively brief coverage of human-computer simulation, essentially nothing on "simple" simulations.

Boocock, Sarane S. and E. O. Schild, *Simulation Games in Learning*. Beverly Hills: Sage Publications, 1968. A diverse collection of essays and research reports. One of the most valuable source books, if not a systematic introduction to the field. Most will read it selectively, but serious simulators should be familiar with it.

Chapman, Katherine, James E. Davis and Andrea Meier, *Simulation Games in Social Studies: What Do We Know?* Boulder, Colorado: ERIC Clearinghouse and Social Sciences Education Consortium, 1974. Much good, general material on the use of games, but the distinctive value is focus on evaluation research. A good survey of a relatively weak, but potentially important, literature. A bit uncritical with respect to the methodology of such studies, however.

Greenblat, Cathy S. and Richard D. Duke, *Gaming-Simulations: Rationale, Design, and Applications*. New York: Halsted Press, 1975. A text with readings. Best available selection of readings, and a comprehensive

overview of the field. If you could choose only one book, this would be the one to select.

Guetzkow, Harold, Chadwick F. Alger, Richard A. Brody, Robert C. Noel and Richard C. Snyder, *Simulation in International Relations.* Englewood Cliffs: Prentice-Hall, 1963. An in-depth study, from several perspectives, of the development of the Inter-Nation Simulation for research and teaching. Still an excellent resource, especially for its self-consciousness about the role of theory in the design of political simulations.

Heyman, Mark, *Simulation Games for the Classroom.* Bloomington, Indiana: Phi Delta Kappa, 1975. 32 pages for 50¢ makes this the best deal on the market. An intelligent, concise introductory essay containing some very useful how-to-do-it tips.

Inbar, Michael and Clarice S. Stoll, *Simulation and Games in Social Science.* New York: Free Press, 1972. Twelve case studies of game development, written by the developers. Uneven with respect to insightfulness and usefulness to political simulators, but the best essays (such as William Gamson's discussion of the development of SIMSOC) are well worth reading. Designers will find it especially useful.

Maidment, Robert and Russell H. Bronstein, *Simulation Games: Design and Implementation.* Columbus: Charles E. Merrill, 1973. As the title suggests, this is particularly valuable for the would-be designer. Generally thorough and logical in its approach.

Political Research Using Simulation/Games

Coplin, William D., *Simulation in the Study of Politics.* Chicago: Markham, 1968. Essays discussing research efforts in six areas of the discipline: international relations, urban affairs, organizational behavior, elections, political recruitment, and political development. Features critical commentary by non-simulators. Useful bibliography.

Guetzkow, Harold (ed.), *Simulation in Social Science.* Englewood Cliffs: Prentice-Hall, 1962. Descriptions of research simulations in a wide variety of areas. As an inventory of current research, it is dated, but its diversity is still impressive and useful as a stimulator of new ideas.

Raser, John R., *Simulation and Society: An Exploration of Scientific Gaming.* Boston: Allyn and Bacon, 1969. Good analysis of the logic of simulation, and particularly strong in its discussion of the history of the art. Considerable attention to political science, especially international politics.

Reference Works

Belch, Jean, *Contemporary Games (Vol. 2): Bibliography.* Detroit: Gale Research Co., 1974. Comprehensive and well-organized. Expensive

($45), but worth it for the library. References virtually all relevant documents through 1973.

Charles, Cheryl L. and Ronald Stadsklev, *Learning with Games*. Boulder, Colorado: Social Science Education Consortium, 1973. Useful descriptions of 70 available games, many of which may be of interest to political scientists. Also very useful are bibliography of relevant books and other bibliographies, and directory of game developers and publishers.

Zuckerman, David W. and Ronald E. Horn, *The Guide to Simulation/Games for Education and Training*. Lexington, Massachusetts: Information Resources, Inc., 1973. Describes over 600 games. Contains useful material on design and use of games, as well.

Periodicals

Simulation and Games. Beverly Hills: Sage Publications. Quarterly. Features research reports (the best single source of evaluation research), descriptions and reviews of games, reviews of new books in the field. For scholarly standards and willingness to admit criticism of gaming, this is the best around.

Simulation/Gaming/News. Box 3039, University Station, Moscow, Idaho 93943. Five issues per year. A comprehensive newsletter, featuring the most complete available reporting on new materials and literature in the field, plus coverage of conferences and activities within the simulation community.

Teaching Political Science. Beverly Hills: Sage Publications. Quarterly. Typically contains an article or two per issue on simulation. Stress on evaluation research.

APPENDIX: FOUR EXAMPLES

The following descriptions outline some unpublished simulations which we and others have developed for and used in our courses. They are fairly typical examples of what any instructor can do in the way of simulation design. These examples represent several of the dimensions we have discussed in the text: all four levels of analysis are represented; they vary in the number of participants required, and in their demands for space; they range from very brief to open-ended; and they illustrate both dynamic and static environments. It is hoped that these descriptions will suffice to convey a good understanding of what each game is about, though they fall short of providing full details. They may even provide a basis upon which readers can construct their own games. We certainly have no objection to that. If a fuller look at a developed simulation is desired, we suggest obtaining a commercially-produced game for examination. We have no desire to endorse products, and a comprehensive inventory is beyond the scope of our ambitions (see, however, the references in the annotated bibliography), but we would recommend the following as being among those worth looking at:

SIMSOC, by William Gamson. New York: Free Press, 1972.

Presidential Election, by Marvin G. Weinbaum and Louis H. Gold. Hinsdale, Illinois: Dryden Press, 1974.

The National Policy Game, by John L. Foster, Thomas A. Henderson, and Daniel G. Barbee. New York: John Wiley & Sons, 1975.

The Inter-Nation Simulation, by Cleo Cherryholmes and Harold Guetzkow. Chicago: Science Research Associates, 1966.

The New Alexandria Simulation, by Donald R. Jansiewicz. San Francisco: Canfield Press, 1973.

The Congressman at Work, by Leonard Stitelman and William D. Coplin. Chicago: Science Research Associates, 1969. (One of a series, all of which are worth examination.)

Nine Men Plus, by William I. Gorden. Dubuque, Iowa: William C. Brown Co., 1971.

I. The Armageddon Game

Level: Individual Decision Making

Theoretical Perspective: At one level, the game is a very simple exercise in the maximization of expected utility. At another, it involves coping with a profound moral dilemma. The core of the exercise involves articulating between these two dimensions, i.e. the translation of almost ineffable values into decisional premises.

Setting: Each individual is asked to assume the role of the President of the United States. A choice is to be made on the basis of information supplied in the simulation instructions. There is no opportunity to interact with others, and strictly limited decision time.

Environment: There is no interaction with the environment other than reception of a statement of the consequences of the individual's decision. However, this is for information only, and requires no subsequent action.

Problem: The President is notified that a certain number of Soviet missiles are on their way toward the United States. He (she) is further informed that there is a certain probability that a mistake has been made, and that these are not missiles at all. Assuming that they are, estimates are provided as to the damage that they are likely to do (very high). Information is also supplied regarding the U.S.'s strike capability, first and second, and the damage that would likely be inflicted by it if it were to be employed. The President has three possible choices: (1) fire now, thus maximizing the impact of the retaliatory strike, at a small risk of horrible error (should there turn out to be no Soviet missiles); (2) await the arrival of the missiles, if there are any, then strike back with whatever firepower has survived the first strike; or (3) resolve not to attack at all, whether or not the Soviets prove to have initiated a conflict. From the information and specific probabilities supplied, the President can precisely estimate the consequences, in terms of lives and other damage (expressed in dollars or in destroyed military capability) of each choice. But, do such expected utility computations provide a basis for choice? If not, what does?

Materials: A brief manual provides all necessary information. A form is provided for indicating a choice and the reasons for making it.

Rules: The game is utterly simple. Students are given a fixed period of time (20-30 minutes at most, unless one chooses to make it a homework assignment) to perform whatever calculations are desired, and to make and explain a decision. There is no non-decision option, since failure to decide within the time limit is equivalent to choice #3.

Facilities: No particular facilities are required.

Options: The game may also be used as a group-decision problem. Or, interesting results may be obtained through playing first with individuals, then grouping and playing again. When doing this, it is best to form groups composed of individuals who made different choices when playing the game as individuals. In any case, it must be noted, post-game discussion is essential to the impact of the exercise.

Courses: Can be used in courses dealing with foreign or public policy, or political theory.

II. The Arms Control Game

Level: Negotiation and Bargaining

Theoretical Perspective: Negotiation is seen as a process of communication and influence. Primary concern is with the tension between problem-solving (in this case, finding a fruitfully negotiable issue), and bargaining (attaining a desired outcome, given the issue). The former requires openness and flexibility, while the latter stresses concealment of values and toughness. Secondary theoretical interest is in the effects of different types of bargaining behavior, e.g. threats, promises, initiation of new proposals, commitments, and style (especially task-orientation vs. affect-orientation). Potential also exists for examining the role of "third" parties, either as mediators or as coalition partners.

Setting: An arms control conference on a simulated continent (for practical purposes, the "world") consisting of eight nations. All eight may be represented, or as few as three.

Environment: Static. No interaction between events at the conference and events elsewhere—though the simulation may be elaborated in this direction for theoretical purposes other than those noted above. As an option, each negotiator may be provided with a "foreign minister," whose task is to approve all significant moves and to consult as necessary. One individual (we tend to use the instructor or teaching assistant) may serve as foreign minister for all negotiators, as consultations are private and only one room is provided for them.

Problem: To negotiate a ban on the testing of a dangerous chemical weapon. Two states ("superpowers") possess both the weapon and means of delivery. A third, loosely allied to one of the superpowers, possesses only the weapon. The other five have not developed it. The problem is modeled closely on the conditions which preceeded the Limited Nuclear Test Ban. The weapon (we currently call it PS-5884) is being tested both in the atmosphere and in laboratories. There is considerable fear as to the pollution potential of such tests, as well as fear of a dangerous arms race. There is agreement that the testing should be stopped, if possible.

The difficult issue is the banning of laboratory tests. One superpower insists that on-site inspection is absolutely necessary for an acceptable agreement, while the other, fearing espionage, refuses to accept any form of on-site inspection. Neither will bend from this position. The central question posed by the simulation (revealed to participants only after the game is concluded) is whether this impasse will induce such frustration and hostility as to preclude a feasible if more limited agreement to ban atmospheric testing. More than half the time, in our experience, it does.

The negotiation may be made richer, and log-rolling possibilities introduced, by the provision of side-issues, such as limiting the development of aerial delivery systems. We have tended to omit these, or to make them non-negotiable, however, in order to clarify the focus of the simulation on its central theoretical problem.

Materials: Each student is provided, at least a day or two in advance, with a game manual outlining the recent history of the controversy, salient features of the countries involved, and the rules of the conference. Prior to the commencement of the simulation, each participant is given a detailed set of "negotiating instructions" from his or her foreign office. These outline the country's goals in the negotiation, indicate the types of outcomes which would be acceptable and unacceptable, and suggest negotiating priorities. Also provided at this time is a proposal introduced by three neutral nations. It is general enough to be debatable, and gives participants something to talk about initially.

Rules:

1. *Procedure:* Essentially open. Negotiators may speak at any time, leave the room (to consult or for any other reason), and may meet in subgroups in the auxiliary room, providing it is unoccupied. Time limits (generally 2 hours for the exercise) are announced in advance. Any agreements must be written in full and initialed by all parties.
2. *Mediation:* No formal rules, though participants are advised that any agreement excluding one of the "chemical powers" will be essentially worthless.
3. *Behavior Constraints:* The negotiating instructions limit the options available to each participant. They are closely enforced by the foreign ministry, if there is one, or by the game director. Should a negotiator attempt to reach an agreement precluded by these instructions, it is considered invalid. No variables not included in the initial scenario may be introduced. For instance, negotiators cannot "discover" nuclear weapons and threaten to use them, or invent naval power to enforce a blockade. The game director will occasionally have to intervene in order to rule out threats based on such non-game factors.
4. *Goals:* These are generally spelled out for all states in the game manual, and for each state individually in the negotiating instructions. Very little flexibility is allowed.
5. *Environmental Response:* Essentially, none. The foreign ministry represents an environmental factor, but functions only as a rule-enforcer.
6. *Police Rules:* Handled *ad hoc* by the game director, who monitors the simulation continuously.

Facilities: A medium-sized room with an appropriate-sized table is all that is required. A second room for conferences is recommended. Monitoring via remote audio or video is desirable, though not essential. Similarly, the foreign minister role can be handled through an intercom, if available. The foreign minister should be in a position to monitor continuously when not interacting.

Courses: Has been used in junior-senior courses in international politics and in a senior-level seminar on negotiation.

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*The simulation has been developed by Charles Walcott and P. Terrence Hopmann, with the cooperation and encouragement of the Quigley Center for International Studies, University of Minnesota.

III. The Legislative Game

Level: Legislative Process

Theoretical Perspective: A simulation as complex as this tends to lack clear focus, since many things are happening, and they can be variously analyzed. Legislative structure and process, the role of rules, logrolling, etc. are all involved. However, the particular emphasis of this model is upon the dilemmas of representation, and the conflict between representational demands and both conscience and the desire to gain respect and influence among one's peers.

Setting: The U.S. House of Representatives (scale model). The game has been run with as few as 20 players, and as many as 50. The theoretical upper limit for participants would be 435 (or more, if interest groups roles are added). The practical upper limit would be far short of this, but would depend upon available resources.

Environment: Each player is assigned to an actual Congressional district. Interaction is possible with the district through opinion polls: once a week, each legislator may submit 3 questions to her/his constituents through the device of the Practically Omniscient Opinion Poll (POOP). Responses are computed (by the instructor or assistant, using knowledge of district characteristics and whatever wisdom can be summoned), and fed back to the legislator. The quality of these responses is determined by the rule, if you ask a silly question, you get a silly answer. Students thus learn something of the limitations of interest and knowledge one finds in the electorate. The constituency acts one final time, at the end of the game, when it either returns or replaces its representative.

Also active in the environment are interest groups. An imaginary, but realistic array of eight interest groups takes stands on issues, and articulates these, both in terms of their preference and how strongly they feel about an issue. Legislators are informed in advance how important each such group is in their districts: very important, fairly important, or not important. The salience of interest group pressure for each representative can thus be estimated. The interest groups are not assumed to be tied to parties or to be particularly predisposed for or against any particular legislator—thus no discounting for these factors is necessary. The interest group positions are also developed by the instructors, though the job of handling both these and POOP could be delegated to students.

Reelection is a function of three factors: the partisan makeup of the district (determined by recent election results), the degree to which the representative has conformed to general constituency preferences, and responsiveness to important interest groups. (Actual constituency reactions to each legislative issue are in fact established: legislators can only discover what they are, though, through intelligent use of POOP.) A

formula has been developed for relating these factors, based upon each legislator's voting record, with final votes being weighted more heavily than other votes, and additional credit (or debit) being assigned for sponsorship of legislation. The formula simply awards or subtracts points, based upon the direction and intensity of constituent feeling, and those plus salience for interest groups. Probability of reelection, then, is determined somewhat arbitrarily by simply looking at points and the partisan makeup of the district, and coming up with a reasonable figure.

There is also an internal environment to be considered. Each legislator, at the end of the game, is rated by his/her colleagues on such dimensions as reliability, effectiveness, and leadership. The results of this are computed by the instructor, and may be made public.

Problem: The usual duties of a legislative body are taken up. Committees are developed, reflecting current legislative concerns, and the legislators have the responsibility of organizing the body and drafting legislation. They are assigned party identification based upon that of the actual incumbent of their district, and organize along partisan lines. Their problem is simply to perform as effectively as possible, according to whatever criteria they choose, seeking reelection, esteem, or to satisfy conscience according to their own lights. The reelection and peer rating results are made known to them, but do not enter into grading.

Materials: The interest group and POOP materials are supplied routinely. Presidential admonitions may also be supplied. The value of these is primarily to give cues. All other materials (bills, etc.) are generated as the game progresses. Access to a ditto machine is crucial.

Rules: The usual rules governing legislative bodies apply. Goals are determined individually. The environmental response rules are detailed above. Policing is handled by the instructor/game director *ad hoc*. One salient rule: non-attendance will not be penalized in any of the computations, but will, in extreme cases, result in an "unsatisfactory" for this part of the course.

Facilities: An adequate room for sessions of the full House, plus rooms for committee meetings is all that is required.

Timing: May be played as often and as long as desired. Works well on a once-a-week basis, with two of every three weeks being devoted to committee work. Assuming preparation in advance (bill-writing, time to consult relevant sources to find out something about the district and its incumbent's voting record, etc.), six weeks on a once-a-week basis is sufficient.

Courses: Has been used in introductory American politics, and upper level legislative process courses.

IV. World Politics

Level: International System

Theoretical Perspective: Multifaceted. The game is an elaboration of the Northwestern Internation Simulation (INS), which broadly represents the outlines of the international system, with considerable emphasis upon domestic constraints in foreign policy. The INS has been modified in this particular case to place more stress upon economic interdependence. As the INS has long been published, and is described well in the literature (see bibliography), we will dwell here upon the modifications.

Setting: A world consisting of 5-8 nations, each played by a 3-5 person team. A scenario may be used to present these teams with a problem to solve, though other goals may emerge during the game.

Problem: At a minimum, in the INS, decision-makers strive to maintain themselves in office. This means satisfying the domestic population with regard to both the conduct of foreign affairs and the provision of domestic economic growth and consumption satisfaction. Whereas trade in the basic INS is possible and may be desirable, it is not really mandatory. In this version it is. Four basic natural resource groups are specified, and industrial (including military) production is dependent upon having enough of each, as is feeding the populace. However, no nation is made self-sufficient in such resources. Thus, everyone must trade in order to run the economy. Some nations are, of course, made rich, others poor. Some are rich in one resource, but poor in all others. It thus becomes possible to create simulated nations with the kinds of problems and potential of, say, Saudi Arabia. Thus the usual problems of dealing with the international political/military environment are made a bit more complex by the introduction of a difficult but potentially solvable economic problem for each nation.

Materials: The basic INS materials may be used, with some modification to reflect the more elaborate economics.

Rules: Identical to INS, except as noted above.

Facilities: One large, subdivided room at a minimum. Several small ones are better. Access to a calculator is just about mandatory.

Options: This game illustrates an option which is always available to simulators: that of taking a good, existing game and developing it a bit more in a desired direction. It lets you be creative, but still benefit from the considerable efforts of others in doing the initial development.

Courses: International politics.